

# SUPPLEMENT.

# The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE;

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

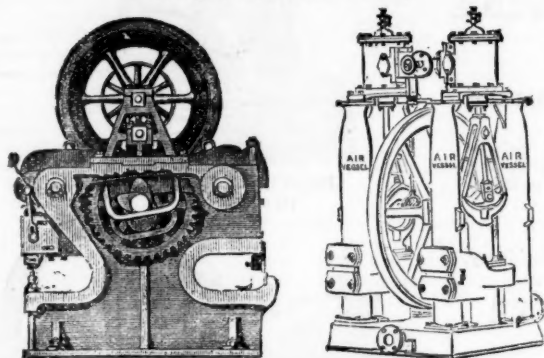
[The MINING JOURNAL is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.]

No. 2268.—VOL. XLIX.

LONDON, SATURDAY, FEBRUARY 8, 1879.

PRICE (WITH THE JOURNAL) SIXPENCE.  
PER ANNUM, BY POST, £1 4s.

**JOHN CAMERON'S**  
SPECIALITIES ARE ALL SIZES OF  
**Steam Pumps, Shipbuilders' Tools,  
BAR SHEARS.**  
ESTABLISHED 1852.



**OLDFIELD ROAD IRON WORKS,  
SALFORD, MANCHESTER.**

For Excellence  
and Practical Success  
of Engines



Represented by  
Model exhibited by  
this Firm.

**HARVEY AND CO.**  
ENGINEERS AND GENERAL MERCHANTS,  
HAYLE, CORNWALL.  
LONDON OFFICE,—186, GRESHAM HOUSE, E.C.

MANUFACTURERS OF  
PUMPING and other LAND ENGINES and MARINE STEAM ENGINES  
of the largest and most approved kinds in use, SUGAR MACHINERY,  
MILLWORK, MINING MACHINERY, AND MACHINERY IN GE-  
NERAL. SHIPBUILDERS IN WOOD AND IRON.

MANUFACTURERS OF  
HUSBAND'S PATENT PNEUMATIC STAMPS.  
SECONDHAND MINING MACHINERY FOR SALE,  
IN GOOD CONDITION, AT MODERATE PRICES—viz.,  
PUMPING ENGINES; WINDING ENGINES; STAMPING ENGINES;  
STEAM CAPSTANS; ORE CRUSHERS; BOILERS and PITWORK of  
various sizes and descriptions; and all kinds of MATERIALS required for  
MINING PURPOSES.

THE  
**PHOSPHOR BRONZE**  
COMPANY (LIMITED).



139, CANNON STREET, E.C.  
LONDON.

Alloy, No. II., for pinions, ornamental castings, steam  
fittings, &c. .... 110s. per cwt  
" No. IV., for pinions, pumps, valves, linings,  
cylinders, &c. .... 110s. "  
" N. VI. (must be cast in chill) for bolts, &c. "  
This alloy has very great tensile strength ... 125s. "  
" No. VII., for hydraulic pumps, valves, and  
plungers, piston rings, bushes and bearings,  
for steel shafts ..... 125s. "  
" No. XI., special phosphor-bronze bearing metal,  
wearing five times as long as gun metal ..... 105s. "

The prices of castings vary according to the pattern, the quantity required, and  
the alloy used.

WIRE ROPES, TUBES OF ALL DESCRIPTIONS, &c.

## ASBESTOS

A NEW and INDESTRUCTIBLE ASBESTOS PACKING for  
steam joints and glands, possesses an unusual power of resisting  
heat, works efficiently under the highest pressure of steam, being  
practically indestructible. Apply to—

THE PATENT ASBESTOS MANUFACTURE CO. (LIMITED),  
31, ST. VINCENT PLACE, GLASGOW,  
AND 10, MARSDEN STREET, MANCHESTER.

**BENNETTS' SAFETY FUSE WORKS**  
ROSEKAR, CAMBORNE, CORNWALL.

BLASTING FUSE FOR MINING AND ENGINEERING  
PURPOSES.

Suitable for wet or dry ground, and effective in tropical or Polar climates.

W. BENNETTS, having had many years experience as chief engineer with  
Messrs. Bickford, Smith, and Co., is now enabled to offer Fuse of every variety of  
his own manufacture, of best quality, and at moderate prices.  
Price Lists and Sample Cards may be had on application at the above address.  
LONDON OFFICE,—H. HUGHES, Esq., 45, GRACECHURCH STREET.



PARIS,  
BRONZE MEDAL, 1867.



ORDER OF THE CROWN OF PRUSSIA.



FALMOUTH,  
SILVER MEDAL, 1867

A DIPLOMA—HIGHEST OF ALL AWARDS—given by the  
Geographical Congress, Paris, 1875—M. Favre, Contractor, having  
exhibited the McKean Drill alone as the MODEL BORING MACHINE  
for the ST. GOTHARD TUNNEL.

SILVER MEDAL of the Highland and West of Scotland  
Agricultural Society, 1875—HIGHEST AWARD.

At the south end of the St. Gothard Tunnel, where

## THE MCKEAN ROCK DRILLS

Are exclusively used, the advance made during eight consecu-  
tive weeks, ending February 7, was 24'90, 27'60, 24'80, 26'10,  
28'30, 27'10, 28'40, 28'70 metres. Total advance of south head-  
ing during January was 121'30 metres, or 133 yards.

In a series of comparative trials made at the St. Gothard Tun-  
nel, the McKean Rock Drill continued to work until the pres-  
sure was reduced to one-half atmosphere (7½ lbs.), showing  
almost the entire motive force to be available for the blow  
against the rock—a result of itself indicating many advantages.

The GREAT WESTERN RAILWAY has adopted these  
Machines for the SEVERN TUNNEL; the LONDON AND  
NORTH-WESTERN RAILWAY for the FESTINIOG TUN-  
NEL; and the BRITISH GOVERNMENT for several Public  
Works. A considerable number of Mining Companies are now  
using them. Shafts and Galleries are driven at from three to  
six times the speed of hand labour, according to the size and  
number of machines employed, and with important saving in  
cost. The ratio of advantage over hand labour is greatest  
where the rock is hardest.

These Machines possess many advantages, which give them  
a value unapproached by any other system of Boring Machine.

THE MCKEAN ROCK DRILL IS ATTAINING GENERAL  
USE THROUGHOUT THE WORLD FOR MINING, TUN-  
NELLING, QUARRYING, AND SUB-MARINE BORING.

The MCKEAN ROCK DRILLS are the most powerful—the  
most portable—the most durable—the most compact—of the  
best mechanical device. They contain the fewest parts—have  
no weak parts—act without SHOCK upon any of the operat-  
ing parts—work with a lower pressure than any other Rock  
Drill—may be worked at a higher pressure than any other  
—may be run with safety to FIFTEEN HUNDRED STROKES  
PER MINUTE—do not require a mechanic to work them—are  
the smallest, shortest, and lightest of all machines—will give  
the longest feed without change of tool—work with long or  
short stroke at pleasure of operator.

The SAME Machine may be used for sinking, drifting, or  
open work. Their working parts are best protected against  
grit and accidents. The various methods of mounting them  
are the most efficient.

N.B.—Correspondents should state particulars as to  
character of work in hand in writing us for information,  
on receipt of which a special definite answer, with  
reference to our full illustrated catalogue, will be sent.

PORTABLE BOILERS, AIR COMPRESSORS, BORING STEEL,  
IRON, AND FLEXIBLE TUBING.

The McKean Drill may be seen in operation daily in London.

## MCKEAN AND CO.

ENGINEERS.

OFFICES,

5, RUE SCRIBE, PARIS

MANUFACTURED FOR MCKEAN AND CO. BY

MESSRS. P. AND W. MACLELLAN, "CLUTHA IRONWORKS,"  
GLASGOW.

## SOLID DRAWN BRASS BOILER TUBES

FOR LOCOMOTIVE AND MARINE BOILERS

EITHER

MUNTZ'S OR GREEN'S PROCESS

MUNTZ'S METAL COMPANY (LIMITED),

FRENCH WALLS,

NEAR BIRMINGHAM.

THE PATENT

SELF-ACTING MINERAL DRESSING  
MACHINE MANUFACTORY,

ABERYSTWITH.

IMPORTANT TO GOLD MINING COMPANIES.

MR. GEORGE GREEN supplies EVERY DESCRIPTION of  
MACHINERY for CRUSHING, PULVERISING, CONCENTRATING,  
and AMALGAMATING AURIFEROUS QUARTZ, specially designed for the  
most effective and economical mode of working.  
Estimates and Plans supplied on application.  
Mr. GREEN also supplies his PATENT ORE DRESSING MACHINERY,  
with latest improvements, at reduced prices.  
Testimonials from the most extensive Mines in Great Britain, and also from  
Foreign Mines, will be forwarded on application.

## DUNN'S ROCK DRILL,

AND

AIR COMPRESSORS,

FOR DRIVING BED ROCK  
TUNNELS, SINKING  
SHAFTS, AND PERFORMING  
OPEN FIELD OPERATIONS,

IS THE

CHEAPEST, SIMPLEST,  
STRONGEST, & MOST EFFECTIVE  
DRILL IN THE WORLD.

Dunn's Patent Rock Drill Company

(LIMITED).

OFFICE,—193, GOSWELL ROAD

LONDON, E.C.

PATENT

"INGERSOLL ROCK DRILL,"

LE GROS, MAYNE, LEAVER, & CO

60, Queen Victoria Street, London, E.C.

5, PARK PLACE, NEW YORK, U.S.A.



We claim 40 per  
cent. greater effec-  
tive drilling  
power, and offer  
to compete with  
any machine  
of its  
class;

The following ex-  
tracts from the re-  
ports of Judges in  
awarding Medals:—

"2. Its simple  
construction ensures  
durability, &c.

"4.—The steam or  
air cushions at each end of cylinder effectually protect from injury

"5. Its having an automatic feed, giving it a steady motion, &c.

"6. Its greater steadiness and absence of jar and vibration ex-  
perienced in other drills, which is very destructive to their working  
parts, &c.

"7. Its greater power is some FORTY PER CENT. in favour of the  
Ingersoll."

Medals awarded for several years in succession "For the reason  
that we adjudge it so important in its use and complete in its con-  
struction as to supplant every article previously used for accom-  
plishing the same purpose."

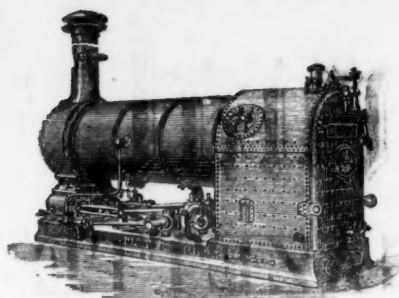
Estimates given for Air Compressors and all kinds of Mining  
Machinery. Send for Illustrated Catalogues Price Lists, Testi-  
monials, &c., as above.



# ROBEY & CO., ENGINEERS, LINCOLN.

AWARDED GOLD MEDAL, PARIS EXHIBITION, 1878.

SOLE MANUFACTURERS OF THE



THE PATENT ROBEY FIXED ENGINE AND LOCOMOTIVE BOILER COMBINED  
4 to 50-horse power.

No Expensive Brick Buildings or High Chimney required.



## PATENT IMPROVED ROBEY MINING ENGINE

OF ALL SIZES, FROM 4 TO 50-HORSE POWER.

Some of the advantages of this New Engine are as follows:—

**SMALL FIRST COST. SAVING OF TIME AND EXPENSE IN ERECTING. EASE, SAFETY, AND ECONOMY IN WORKING. GREAT SAVING IN FUEL.**

This New Engine is free from all the objections that can be urged against using the Semi-Portable Engine for permanent work, because it possesses the rigidity and durability of the Horizontal Engine, and at the same time retains the advantages of the Semi-Portable in saving time and expense in fixing.

## THE PATENT ROBEY FIXED ENGINE

(Also above illustrated) is admirably adapted for driving Rolling Mills, Saw Mills, Brick Machinery, Pumping Machinery, and all descriptions of Fixed Machinery.

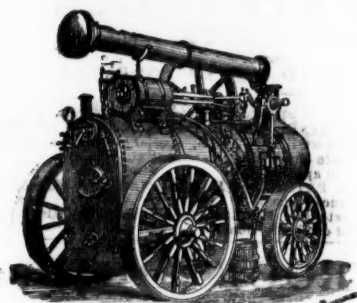
**ENGINES UP TO 200 EFFECTIVE HORSE-POWER ALWAYS IN PROGRESS.**

Prices and full particulars of all the Machinery here illustrated on application to the Sole Manufacturers,

**ROBEY & CO.,**

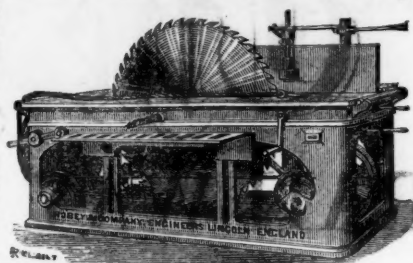
**ENGINEERS, LINCOLN, ENGLAND.**

London Office: 117, Cannon Street, London, E.C.



VERTICAL STATIONARY STEAM ENGINE AND PATENT BOILER COMBINED,  
1½ to 16 horse power.

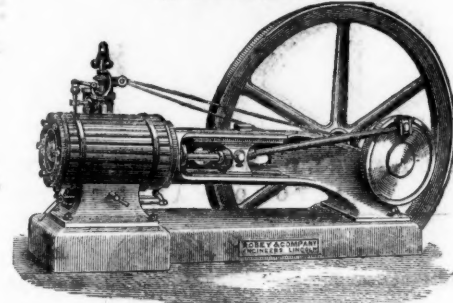
SUPERIOR PORTABLE ENGINES,  
4 to 50-horse power.



SELF-ACTING CIRCULAR SAW BENCH.



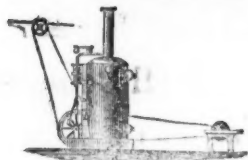
PATENT VERTICAL ENGINES,  
1½ to 16 horse power.



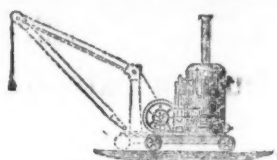
IMPROVED HORIZONTAL FIXED STEAM ENGINE,  
4 to 60-horse power.

References can be given to upwards of 5300 ENGINES of all sizes, from 2 to 50-horse power.

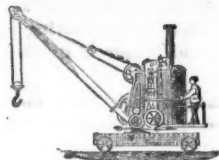
## CHAPLIN'S PATENT PORTABLE STEAM ENGINES & BOILERS.



STATIONARY ENGINE.  
No building required.



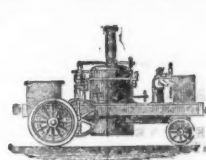
HOISTING ENGINE.  
With or without Jib.



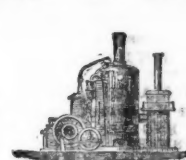
STEAM CRANE.  
For Wharf or Rail.



CONTRACTORS' LOCOMOTIVE.



TRACTION AND ROADWAY ENGINE.



SHIP'S ENGINE AND DISTILLER.



PUMPING AND WINDING ENGINE.

The ORIGINAL combined Vertical Engines and Boilers, introduced by Mr. CHAPLIN in 1855, specially designed and adapted for

Pumping, Winding, Hoisting, Sawing, Driving Machinery, and for General Contractors' Work, Railway Sidings, Coal Mines, Quarries, Gas Works, &c.

**WIMSHURST, HOLLICK, & CO., ENGINEERS, 2, WALBROOK, LONDON, E.C.**

WORKS:—REGENT'S CANAL DOCK, 602, COMMERCIAL ROAD EAST, LONDON, E. (Near Stepney Station).

Parties are cautioned against using or purchasing Imitations or Infringements of these Patent Manufactures.

## HUDSWELL, CLARKE, & RODGERS,

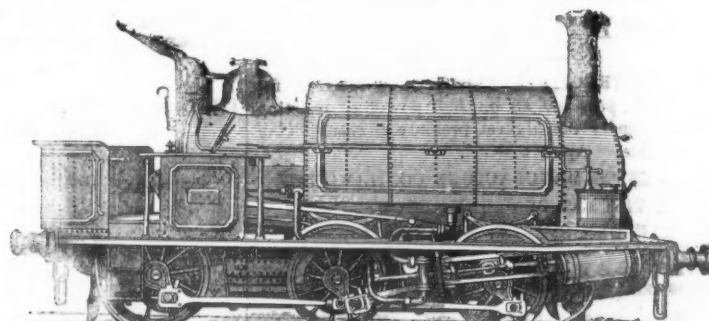
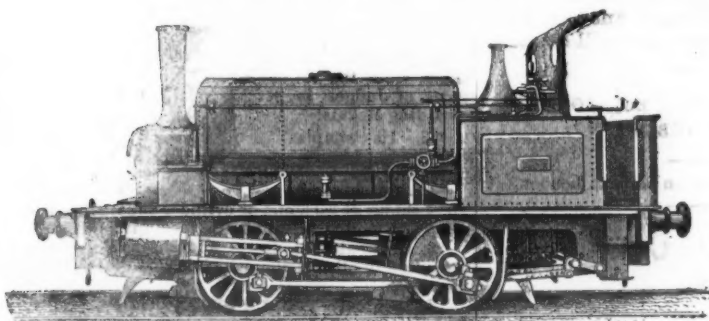
RAILWAY FOUNDRY, HUNSLET, LEEDS,

ARE NOW MAKING A GREATLY IMPROVED CLASS OF

**TANK LOCOMOTIVE,**

EITHER ON FOUR WHEELS OR SET OF VARIOUS GAUGES.

IN WHICH EXTRA STRENGTH AND DURABILITY ARE COMBINED WITH SIMPLICITY AND ECONOMY IN REPAIRS.



FIRE BOXES—Copper. TUBES—Brass. TYRES—Steel. AXLES—Steel. BOILER PLATES AND MACHINERY of the best Yorkshire Iron. NEW LOCOMOTIVES, with Cylinders 8 in., 10 in., and 13 in. diameter, always in stock or in progress. SECOND-HAND LOCOMOTIVES, of various sizes FOR SALE OR HIRE. PRICES AND SPECIFICATIONS ON APPLICATION



## Original Correspondence.

## PENNSYLVANIA RAILROAD MORTGAGE BONDS.

SIR,—Allow me to draw the attention of your numerous readers to the Pennsylvania Railroad Six per Cent. Sterling Mortgage Bonds as a good investment, and where a certain improvement in price may be looked for. The security is more than ample, and the interest is paid on Jan. 1 and July 1 at the London Joint-Stock Bank in pounds sterling. Money on good security is worth 2 to 4 per cent. per annum, and 2 per cent. is the rate the banks are giving for deposits. The New York Central and Hudson River Currency Mortgage Bonds are quoted 124 to 125; Baltimore and Ohio Sterling Bonds, 111 to 112; Milwaukee and St. Paul, 106 to 107; Union-Pacific Railway Omaha Bridge Sterling Bonds, 112 to 113; Sterling Bonds of New York Central and Hudson River Railroad, 115 to 116; United New Jersey Railway and Canal Sterling Bonds, 112½ to 113½; Illinois Central Five per Cent., 103 to 104; and the Six per Cents., 111½ to 112½; Memphis and Ohio Railroad Bonds, 106 to 107. It will be observed that all of these bonds are really 5 to 20 per cent. higher than the Pennsylvania Railroad Six per Cent. Sterling Mortgage Bonds, payable in London, and which are now dealt in on the London Stock Exchange at 100½ to 101, with the accrued interest of 6 per cent. from Jan. 1 last; therefore, a steady improvement in price is certain, and those of your readers having money to invest should not delay purchasing if their object is to make money.

London, Feb. 7.

B. E.

## MINING PROSPECTS ON THE PACIFIC COAST.

SIR,—The new year has opened upon us with brilliant prospects in the near future. Although prosperity has not yet come upon us the outlook in every respect is infinitely better than it was at the beginning of the previous year. Extensive preparations have been made all over the State for prosecuting mining industries by developing the many sources of wealth hitherto but partially revealed. Among the mines on the Stock Board which are exciting much interest in the speculating public of this State are the Sierra Nevada, Union Consolidated, and Mexican, where certain bonanzas are presumed to exist, and to which people here look confidently forward as likely to reward them for past losses and disappointments. Then, again, we are promised rich finds in the Julia and Ward, and possibly in speculative Ophir. The floods in the Hale and Norcross, and in the Savage Mines, which have hitherto proved so detrimental to the interests of these mines, will in the future be prevented by an enormous drain drift, which is on the point of completion. In other mines deeper workings have been supplemented by the addition of improved machinery, and the prospects in some of these are very good. The discoveries of mines in Arizona are most important, and as that territory is now under the fostering care of Gen. Fremont, who brings both experience and ability to encourage the best interests of the State, we may anticipate great results from that quarter.

Since my last letter was written 30 miles of the Southern Pacific Railroad have been completed to Gila Station, and a considerable further extension will soon be announced, as work has been considerably extended beyond this point. It is well to note that further facilities have been afforded to extended mining operations by the disposition of the troops by the officer commanding the Department of Arizona. The troops have been so judiciously distributed by him that not only are the Indians properly guarded but ample protection is afforded to miners and settlers, and a district of country opened up for mining operations which previously, owing to its unprotected character, was closed for all practical purposes, and almost unknown to prospectors. Perhaps the district which attracts most attention at the present time is the Bodie, which last year produced such magnificent results. The winters in this district are severe, and operations have to be in a measure suspended; but in the spring preparations are being made for renewed and increased activity, and there is every prospect of a renewal of the dividends in Grand Prize.

An important strike of new ore development was recently made on the Standard, the ore being of the same rich character as that which sent Bodie up into the fifties some months since. A much larger yield of bullion, and consequently an increased amount of dividends, may be counted on from this mine. The Jupiter Company have also recently struck a well-defined 3-ft. ledge of ore, assaying about \$1100 per ton. Other companies report excellent prospects, and are prosecuting work with vigour.

A temporary cloud has been overhanging the holders of mining property here owing to a claim of some outsiders to the land comprised in the 16th and 36th sections, which include Bodie, South Bodie, South Standard, Champion, and South Bulwer. These sections have been granted to the State as "school lands." The miners who first occupied the land neglected to apply for it as they should have done after six months of possession. This afforded a loophole for certain sharp practitioners who subsequently bought the land from the State. By the law of 1853 mineral lands are excluded in State grants, and the present occupants can, therefore, prove up and patent their claims under the Federal Law. The determination of the case at law would cost enough to ruin both claimants and contestants, so it is probable that an amicable arrangement will be resorted to.

As I have stated in a former communication, the mines of Utah have lately been attracting considerable attention. Their development within the last eighteen months has been something wonderful, and they have been the subject of interest to Eastern capitalists, who have invested largely in them. Secretary Sherman recently alluded to the fact that the production of silver in Utah and Colorado was likely to aid in further depreciating silver coin, but this is by no means likely to be the case. Infinitely greater finds than at present are at all probable would have to be developed before any appreciable effect could be made in this respect. All the assays from the famous West Tintic district carry a heavy percentage of gold in addition to the silver. Four assays recently made from fair samples gave an average of no less than \$74.15 gold per ton and \$40.43 silver. From all accounts the people of New York and other eastern cities are so fully impressed with the stability and worth of our mines, that all classes are seeking investments in them. This has been more particularly the case during the last three or four months. They are aware of the fact that most of the honestly conducted mines are paying dividends of from \$1 to \$1.50 per share per month. Some of them pay less than these amounts, but others pay considerably higher dividends. The cause of this excitement in the East is attributable, no doubt, to the hope of finding a safe and fairly profitable investment for capital more than with a view to speculation. Investments in real estate and railroad stocks do not pay in the East, and in other fields of speculation there distrust or depression have driven away would-be speculators. In the matter of gravel mines alone it is well known that Eastern as well as several European companies are deriving large dividends, and the nature of such property is such that in most cases these dividends may be counted on without let or hindrance for many years to come. We in California learn little of the details of these operations and profits, for these mines do not appear on the Stock Board, but the results are duly appreciated by the fortunate shareholders abroad.

During the past six years the Bald Mountain Mining Company, Sierra County, have paid dividends to the amount of \$664,000, the total amount of gold taken out of the mine for that time being \$1,300,000. This is only one of many similar instances where these mines are richly rewarding their owners. In Lake County a discovery has been made of a valuable quicksilver mine that is likely to rival the celebrated Sulphur Bank Mine. The ledge is easily traced for miles, and thousands of tons of cinnabar are being exposed to sight as the crust is cleared off. At Tom Tahute, Eureka district, the Wyandotte and other mines are being developed with great success, the work progressing rapidly. The ore vein shows an abundance of good rock, which is fully up to the standard of the lot sent to the Eureka and worked at the Richmond furnaces, and will average a smelting value of \$150 per ton. Placer diggings of a valuable character have recently been found in San Luis Obispo county, in the vicinity of the head-waters of the Saturnas river, from

which nuggets weighing \$25 and giving \$30 pure gold have been taken. The whole country lying along the eastern slope of the Pausa Mountain and extending as far south as the Carles Ranch is known to be auriferous, but is only now being prospected.

The great want felt by the owners of Californian mines is money for development. They can get no assistance from the ordinary banking institutions of the country, for these find ample employment for their capital nearer the centres of business. In the same way the owners of land, and those who are engaged on profitable enterprises in remote parts of the country, are helpless when money is required by them for further improvements or developments. The security they offer is unquestionable, and can in most cases be realised upon at once, but loans are not forthcoming. In this way foreign capital would often find safe and profitable investment.

At the annual meeting of the Consolidated Virginia Company great excitement was expected in view of the recent charges made against the management of the company. But although these charges were of a most serious character hardly a protest was made on the subject. The secretary stated that out of 540,000 shares in the mine 433,024 were represented. The acts, disbursements, &c., of the board of directors were fully ratified and approved, and a resolution was adopted to protect the board of trustees "by all possible means from all attempts at black mail," and from other attacks from whatever quarter they might come. This unequivocal endorsement by the shareholders of the company appears to settle the question of mismanagement completely, as it is obvious that they would be the first to complain if things had been mismanaged.

I give the bullion product for the Pacific Coast, as taken from the returns of Messrs. Wells, Fargo, and Co., for the past year:—

California	\$18,920,461
Nevada	35,181,949
Oregon	1,213,724
Washington	73,311
Idaho	1,868,122
Montana	9,763,640
Utah	6,064,613
Colorado	6,232,747
New Mexico	453,813
Arizona	2,287,983
Dakota	2,215,804
Mexico (West Coast)	1,594,995
British Columbia	1,283,460

Total \$81,154,622

The production, after deducting the amounts from British Columbia and W. Coast of Mexico, is \$78,276,167, against \$95,811,582 in 1877.

San Francisco, Jan. 15.

E. J. J.

## THE SAN FRANCISCO COPPER MINE—CEMENT COPPER.

SIR,—I had an opportunity a short time since of visiting Nevada county, California, and at a point near to the boundary of this county with that of Yuba is a mine at work called the San Francisco Copper Mine. The ledge here is of large size, from 80 ft. to 100 ft. wide in places, the ore being a low-grade yellow sulphuret of copper, of from 5 to 10 per cent. and upwards. As an ore of this kind in this country could not be profitably worked without some process of concentration, the company have adopted that of making it into cement copper, which is easy of accomplishment, and at the same time economical.

The ores which are raised to the surface are mined (stoped) at \$1.10 per ton, and after it has been raised to the surface it is laid in heaps of (say) 80 to 100 tons. Containing as it does an abundance of sulphur, it requires only a very small quantity of wood to set it on fire, it then continues to burn without the addition of any more fuel, until the sulphur has gone off, when the ore is ready for leaching; it is then taken to and placed in high square tanks, which hold each about 2 tons, and covered with water. After standing a few hours the solution, which is of a greenish colour, is run into large receivers below; whilst the ore in the tank, which is now called "waste," is drawn out through a manhole and put to the waste pile. The solution is now ready to give up its copper, and for this purpose is conveyed into large wooden cylinders, or barrels, mounted upon wheels, and made to revolve with a very slow motion. These cylinders hold about 2200 gallons each; about 3 tons of old iron are also put into the cylinders, and in about three hours all the copper contained in the solution having been precipitated, a fresh quantity of the solution is added, and so on, until all the iron is used up in the process. The chemical change which has now taken place leaves a mass of pasty red mud, which on being dried until all moisture has evaporated leaves a product called "cement copper," and this contains from 80 to 90, and sometimes as high as 95 per cent. of metallic copper. This cement copper is especially valuable as a product for making a very superior grade of bluestone, being largely used for the working of silver ores in the State of Nevada, or it goes to Mexico for a like purpose.

During the present season the company have made extensive additions to their works, increasing the capacity for production, and for economy, and to expedite the handling of the ores. In addition to the old ore shed 350 ft. x 60 ft., a new one has been built on top of the hill above the mine, but conveniently near thereto. This shed being about 500 ft. long will contain 3000 tons of ores, arranged in piles for burning in a single line. It is of importance having the ore roasted above the works, so that the gravitation of the different processes may be down hill, and fortunately the surface contour of the ground favours this. The old shed contains 12 leaching vats, and the new one will contain 20. The reduction works contain four of the revolving cylinders, as above described, and two more are to be put up. A small engine furnishes all the necessary power to drive the machinery.

From the hoisting works the ore hereafter will be conveyed to the top of a hill by a railway, which is now in use. The cars are loaded from ore shoots, and drawn to the top of the hill by a stationary engine. The new improvements will make the working much more convenient than heretofore. The entire improvements made upon the property have cost nearly \$100,000; and as an evidence that it will well repay the company in the future is the fact that no assessments have been levied upon the stock for two years. The capacity of the works for the last half-year has averaged 25 tons of cement copper per month, which required the monthly use of about 500 tons of ore; by the spring, the monthly yield of cement copper is expected to reach 60 tons, worth \$15,000, and the profits on this will be, it is supposed, about \$10,000. The present price of cement copper in the San Francisco market is 17 cents per lb.

In working the ore by the leaching process only about two-thirds of the copper is obtained at first, but the waste pile is continually contributing a large amount of solution containing copper, and as this waste pile increases it will be a point from which a continuous supply of copper solution will be obtained, and will probably furnish one-third of all the cement copper made, and at little or no expense. During the last twelve months the production has not only met all expenses but has carried all the improvements now approaching completion. To all appearance the mine has an unlimited quantity of ore, which will increase in richness as the mine is deepened. The shaft is down 150 ft., in ore all the way, but little has been done below 50 ft., the ledge being so large as to have supplied all ore yet raised from that depth!

There are 50,000 shares in the incorporation, mostly held in San Francisco, and in few hands. The enterprise is now a decided success. The shareholders held on through a season of depression, but they can now see the time when dividends are certain to be realised, which will be next season. The business has been very ably and successfully conducted under the intelligent management of T. Lemmen Meyer, the president, of San Francisco, and the gentlemanly superintendent, C. Borger, at the mines, by whose courtesy and kindness I am enabled to give you this short and very inadequate description of a property which is soon to all appearance destined to take its stand amongst the leading and legitimate commercial successes of this Coast.

Would not the conversion of the cement copper into sheets be a very profitable employment for capital? Labour is cheap at the mines, wood inexpensive. Bricks can be made on the spot at \$5

per 1000, and other things in proportion. Would it pay an independent company to purchase the cement copper and make sheet copper on the spot? Perhaps some of your able correspondents can answer the question.

Pine-street, San Francisco, Jan.

JOSEPH RICHARDS.

## RICHMOND MINING COMPANY.

SIR,—The estimate of "working expenses" in my letter, which you were good enough to publish in last week's Journal, was for "mining" and "general" expenses only, which as the furnaces and refinery were not working, was all I was entitled to include. The total expenditure of the mine, as shown by the last accounts, is nearly 22,000*l.* per month, as stated by you. The object of my letter was to show that the directors could not possibly pay dividend and debentures out of last year's profits as stated in their circular. Even including the bullion which has been produced since the furnaces were started, and deducting all the working expenses, I calculate that the account would little more than square itself up to this time; but it must be remembered that of the company's assets about 25,000*l.* are locked up in stores, and probably 50,000*l.* in un-realised bullion, together (say) 75,000*l.*, which represents the amount the directors will be obliged to borrow by the time the debentures come to be paid, and which also represents the amount of working capital required to carry on the company. The policy of carrying on such a company as the Richmond without working capital is surely a very short-sighted one, and one which must sooner or later end in a collapse, and it is surprising that the directors with their past experience should not have formed a good reserve fund when they had the opportunity, and so have put the company on a firm footing; the more so, seeing that they have repeatedly admitted the necessity of such a fund. They have always, however, trusted too much to the future, and they have once more been disappointed!

As regards the results to be expected from the present workings, which I hurriedly estimated at 20 per cent. profit in my last letter, I have since been able to go closer into the figures, and the result may be interesting to many shareholders who have not studied the matter, and enable us to arrive at a more certain conclusion. But first it may be well to say a few words regarding the "Eureka Standard Assay," in accordance with which the returns from the furnaces are valued. In the last report the directors explained that after paying marketing expenses only 65 to 70 per cent. of the Eureka assumed value was being actually realised for their bullion, and they estimated that the Eureka standard was therefore 10 to 15 per cent. too high. I find, however, that the actual over estimate was 22 per cent., which I arrive at by taking the gross yield of bullion:—\$1,928,467 at 48*d.* per *£* ..... £385,690

Which, deducting the actual expenses ..... 216,000

Should have left a balance of ..... 169,690

But the actual net profit was only ..... 84,500

Making a difference of one-half ..... £ 85,190

Or 22 per cent. on the gross bullion, being the difference between the estimated and the actual value.

Taking then the accounts issued in 1878—there were 23,254 tons of ore smelted, producing according to the Eureka assay

as above ..... £385,690

Deduct Eureka over-estimate ..... 85,190

Leaves the actual yield (12*l.* 18*s.* 6*d.* per ton) ..... 300,500The expenses were (9*l.* 5*s.* 9*d.* per ton) ..... 216,000And the net profit (3*l.* 12*s.* 6*d.* per ton) ..... £ 84,500

Or 22 per cent. on the Eureka, and 28 per cent. on the actual value of bullion produced.

In 1877 the average of the ore was \$43.90 per ton, and the net profit 25,690*l.*, or only 15*s.* per ton, and 8½ per cent. on bullion!

In 1876 the average was \$51½ per ton. Net profit 28,930*l.*, equal to 15*s.* per ton, and only 7¼ per cent. on bullion!

According to the last two runs the value of the ore now being smelted is \$50 per ton Eureka assay, or deducting 20 per cent. over-estimate, \$40 or 8*l.*! while the expenditure last year, as shown by the accounts, was equal to 9*l.* 5*s.* per ton of ore smelted. Providing, therefore, that the expenditure now is at the same rate as last year, there would appear to be an actual loss of 25*s.* on every ton of ore smelted! instead of a profit. I at least am unable to arrive at a different result, but if anyone can show that I have come to a wrong conclusion, I shall be glad to be put right.

Feb. 5.

INVESTOR.

## RICHMOND MINING COMPANY.

SIR,—In reading the remarks and figures of "Investor" in last Saturday's Journal, I could not help thinking they are a remnant of the depreciatory epistles we were afflicted with some time ago. "Investor" begins by expressing a surprise which is as gratifying to me as it seems disappointing to himself—that the directors of the Richmond Mining Company are going to pay the usual quarterly dividend, and after making out a statement of the affairs of the mine, which he thinks will be found very near the mark, he goes on to say that most of the items of expenditure are probably much understated, while the official estimates of profits will probably be found to be overstated. After admitting that he is unable to estimate the expenditure on new machinery and law expenses, he still ventures another probability by putting down the sum at not less than 10,000*l.* After so much presumption, it is a little astonishing to find "Investor" cannot presume where the money probably will come from to pay the dividend. Would it not be as well for the directors to take "Investor" into their confidence, as he presumes to know a great deal more about the concern than they probably know themselves. Anyone would be called a fool in Yorkshire in trying to run down a concern in which he was a partner; but perhaps "Investor" presumes that the bulk of the shareholders will make fools of themselves by clearing out their shares at any price, and then I presume there would be more than one "Investor." The report of the directors should be of more value than the guesses and surmises of irresponsible scarecrows; but if "Investor" wants to rid his holding, why does he not quietly put his shares on the market, instead of leaving himself open to the suspicion of probable ulterior motives; and as he seems to think that 9½ to 9½ is too high a price, he can quote them as much lower as his tender conscience will dictate—the lower the better for the purchaser. But if he had signed himself "An Intending Investor" he would have made himself more intelligible to a—

Huddersfield, Feb. 4.

YORKSHIRE SHAREHOLDER.

## RICHMOND MINING COMPANY.

SIR,—In the Supplement to last week's Journal you and the public were favoured with a long letter on the demerits of this property by "Investor." Would you allow me a small amount of space to suggest a caution to timid shareholders. A close scrutiny of the letter will plainly indicate that "Investor," by his *nom de plume* as well as the tone of his communication, suggests his purpose, which, without much stretch of the imagination might be safely stated to be a desire to "invest" in some Richmond shares, but at prices lower than those then ruling. Except for this reason, why would he throughout the letter persistently decry his property (if he is a shareholder), and culminate his abuse in the last paragraph but one by this expression—"Which scarcely warrants the present quotation for the shares of 9½ to 9½, ex div." A large holder of the shares is not likely to disparage the value of his own property in this way, but a small holder or no holder at all, if he wants to buy in cheap, can be imagined to take this mode of gaining his end. Being an original subscriber for several hundred shares, and still holding nearly 500 I have some feeling in the matter, and object to seeing a football made of my property to the possible benefit of a few speculative "Investors." There are a number of philanthropic advisers of the Richmond shareholders (one who writes and says a great deal is a registered holder of one share, and of course his advice is disinterested), but the company during the past year having passed through the ordeals of a committee of investigation, a flood,



a fire, and a protracted newspaper correspondence, and having weathered them all so triumphantly, and now sailing in smooth water, it is sincerely to be hoped that this and other similar "Investors" will take other means to secure their purchases, and that shareholders will not be frightened into selling their shares at a sacrifice.—*London, Feb. 5.* FAIR PLAY.

#### FRONTINO AND BOLIVIA GOLD COMPANY.

SIR,—There appears not unlikely to be soon a very active market for the shares of this company. There is no mine on the market so full of promise in the near future as the Frontino and Bolivia. Under Mr. White's management the 1s. or 1s. 6d. quarterly dividends must soon be doubled. Hope deferred has probably sickened a few shareholders, but the great difficulty in getting shares delivered speaks well for the courage and faith of the great body of shareholders. These are not likely—now we are out of the wood—to dispose of their shares at present prices. I see no reason for doubting that in a very short time a profit of 2000%, or 3000% per month will be made: 2700% will pay a monthly dividend of 1s. per share, or 30 per cent. on the capital. A SHAREHOLDER.

#### COAL MINING IN FRANCE.

SIR.—The coal fields in the centre of France are numerous, and small in area singly; they are considered by some geologists as having been deposited in lakes. They are irregular, and most of the seams of coal are found in a fragmentary state—that is, though they are found of great thickness, even up to 80 ft. of coal, yet they are subject to sudden changes.

One of the most remarkable of these basins is that of the Saône et Loire, the principal centres of which are at Creusot, Blanz, Montceau, Montchanin, and Epignac. The measures contain 10 beds of coal. At Blanz two of these beds are each from 30 to 60 feet in thickness. At Montchanin and Creusot one seam of coal is found varying from 60 to 130 ft. in thickness. The contents of most of these basins in Central France are rigidly defined, but those of Creusot and Blanz give some prospect of continuation under the more recent formations.

The Blanz Colliery Company, one of the largest in France, produced in 1877 about 600,000 tons of coal, manufactured 106,070 tons of briquettes, and 20,120 tons of coke; 2741 workmen are employed in the mines, and 2007 on the surface. There are 36 steam-engines erected, of 4200 horse power; these being used for raising coal and refuse, pumping water, ventilating the mines, and working air-compressors. In the workshops on the surface there are further 16 steam-engines, of 450-horse power; and 18 engines, of 620-horse power, are used for the transport of minerals on 25 miles of railway, and on the boats which run on the Saône and the Loire. The total engine power for the various services thus amounts to 5270-horse power. Also 140 horses are employed in the mines and on surface.

The labour of the miners is said to be less arduous at Blanz than at other coal mines in France; eight hours is the length of a day's work, including the time for ascending and descending, making seven hours work in the face. In the seams, varying from 32 to 50 feet in thickness, each man produces rather less than 1 ton of coal daily.

The method of working the Thick beds at Montceau Mines, owned by the Blanz Company, is by horizontal stalls 7½ ft. high, the excavation being afterwards filled up with earth and stonework from the outside. After the lowest stall is filled up a second, and after that a third, is commenced above, and so on in successive stages until the whole thickness of the coal is taken away and successively filled up. Each stage is served by two roads driven in the rock at a distance of 30 or 40 feet from the coal; between these roads and the coal cross-cuts are driven. The lower road is used for the conveyance of coal, and as an intake for air; the upper road is used for the filling in material, and for the return air. The ventilation is effected by means of a Guibal fan. The fire-damp mines worked by this company have been the scene of several accidents, though every precaution is taken. The atmospheric conditions of these mines are attended to and studied by special men; wherever gas is discovered it is dispelled by small portable ventilators. On the occasion of a fall in the barometer communication by telegraph is given to the various pits, and the examinations for gas are more minute. The ignition of coal dust is guarded against by watering the roads. Powder is not used in dangerous localities. The level wedge for breaking down the coal gives good results at Blanz. Hydraulic pressure is used up to 30 tons by means of a small hand pump. The shafts at Blanz are all fitted with guides; the workmen are lowered or raised in safety-cages. No serious accidents have occurred from broken ropes or over-winding.

The air compressors at Montceau represent 380-horse power. Compressed air is used for the boring or rock-drilling machines. The rock is mostly limestone. An advance of 13 to 19 inches per day only is made by hand labour, and three times this by the rock-drills; sometimes to 6 feet per day. There is no saving in cost by the rock-drills, but the saving in time is great. The Dubois-François and the Darlington-Blanz drills are both used here. The system of galleries in the rock, it will be seen, involves an immense amount of drilling at these works. The compressed air is also applied for hauling-engines and ropes, and for local ventilation by Koerting's fans. Underground transport is also about to be effected by locomotives and compressed air; gauge of underground roads, 3½ inches. Coal-cutting machines are used, chiefly in those parts of the mines liable to fire-damp. M. E.

#### THE PUERTOLLANO COAL FIELD IN SPAIN.

SIR,—Well might the town of Puertollano indulge in public festivities when the patent hydraulic borer had disclosed the long disputed existence of a valuable coal seam in its immediate neighbourhood. Mr. Emil Przibilla may claim the honour of being the discoverer of this new and important fuel deposit, for it was him who recommended and executed the successful boring by means of his patent hydraulic boring apparatus. He has given to Spain a coal field which seems destined to take rank amongst the richest coal centres of Europe.

To Spain particularly, a country hitherto comparatively poor in fossil fuel, the event is as fortunate as it is important for the general development of its industry. The Revista Minera of Nov. 24, 1878, gives a more detailed report of the operations subsequent to the above discovery, of which the following extracts may be of interest to the readers of the *Mining Journal*:—

The Puertollano coal field is situated in the Province of Ciudad Real, almost in the centre of Spain, and in the vicinity of main railway lines. The house of Hilarión Roux, Marquis d'Ercómberras, is at the head of the undertaking, and the borings, as well as the subsequent exploration of the coal field, have been done on their account under the management of Mr. A. Massart, their chief mining engineer. When the executed borings had left no doubt as regards the geological age of the valley of Puertollano, and as to the existence of coal in it, the sinking of a large shaft and the erection of suitable machinery for pumping and winding have been decided on. These works were commenced in December, 1877, and on Nov. 12, 1878, after some unavoidable delays, in consequence of retarded delivery of the machinery, the coal seam, 7½ ft. thick, has been passed through at a depth of 25 fathoms. At present all energy is concentrated on preparations and works for a speedy development of the mine, so that the native industry and the public in general may take the earliest advantage of the new discovery.

The area of the coal measures, which have a direction from east to west, approximates 42 to 43 miles, having a longitudinal extent of 13½ and a width of a little over 3 miles, bordered by two mountain ranges of the siluric formation. The coal is covered by tertiary strata and cultivation soil, and the beds appear frequently disturbed and dislocated, as is generally the case in similar formations. The causes of these disturbances in the otherwise horizontal stratification of the beds are, no doubt, attributable to eruptive masses of trachytes in the form of cones. These eruptions are evidently of a more recent origin than the coal beds, for the latter are penetrated and uplifted by the former—a circumstance which speaks well for the quantities to be expected. If the coal beds were

younger than the eruptive masses the coal fields would be much more limited and of less importance; but the coal beds sliding down on all sides of the trachyte cones (four in number), which, without exception, form the top, is an unmistakable sign of their older origin. The explorations have so far established the fact that the beds of the coal measures are generally horizontal, and exhibit a great regularity. At 30 fms. and downward coal sandstone alternates with coal slates in such a way that the latter increase constantly in thickness, and take a more prominent character.

The coal seam in its entire thickness of 7 to 8 ft. supplies a fuel of absolute purity—a compact black coal, shining, and not easily friable, with considerable gas contents (on an average 33 per cent.), which gives to it a high caloric power, and places it side by side of the best English coal. The richness of organic remains in these coal measures is not the least interesting feature from a scientific point of view; and by bearing testimony of the abundant vegetation in the coal period strengthens the supposition that other treasures may be in store at depths not yet reached, hopes which at a not distant time may be realised, as borings to that effect are contemplated. It is the fossil flora which is more prominently represented, particularly in the Upper Sandstone beds, by fragments of calamite, lepidodendrons, and numerous varieties of coniferous plants and ferns. The animal kingdom, less numerous, appears represented by molluscs and fishes of the genus *Dipterus* and *Ctenodus*. The slate clays abound in fossil plants, which frequently form the main substance, while slate clay served merely as an agglomerating medium.

The value of the Puertollano coal field as a source of supply is as yet not fully understood and appreciated, but will be as soon as the development of the mines is more advanced, and a larger output of coals can be recorded. It commands a central position in the country, and is surrounded by numerous and important mining districts, in which lodes of silver, lead, iron, and quicksilver ore predominate. There can scarcely be any doubt that these rich mines will in future receive greater attention of capitalists. Steam will henceforward do the work of the mule and windlass; the rich iron and lead ores, instead of being transported with heavy outlay to distant smelting works, will be treated on the spot. Government has already laid an import duty of 15 per cent. on all foreign coal, and ordered the exclusive use of home coal for the navy. These circumstances will be for the benefit of the fortunate proprietors of the coal field, for there is no other coal in Spain equally suitable for steam purposes under stationary, marine, and locomotive engines. But let us hope that the mining industry in general in this rich mineral country will likewise share the benefits of the new discovery, and receive a fresh impetus for healthy and active development. Zimmerstrasse, Darmstadt, Feb. 3. FRED. DIETZSCH

#### MINING IN THE SOUTH—THE NEW REVOLUTION IN STEEL MANUFACTURE—STRIKES.

SIR.—The statements referred to by your correspondent in last week's *Journal* having been given by some of the London papers as to the exhausted condition of mineral in the South are not conversant with facts. The example I have previously given of the Red Devon Silver-Lead is nearly *ex uno disce omnes*, as anyone who will travel the South may easily prove. Very many existing mines are not exhausted, and the virgin ground in Cornwall and Devonshire is simply immense. If we could have a restoration of confidence on the part of capitalists, and they would invest in first-class mines which can be purchased at the present time at a very low price, they would find at the revival of trade that they would make large fortunes. The recent collapse of the Cornwall Bank is a strong evidence of the want of confidence, and the bad policy of undue and unreasoning pressure. A bank which can pay a composition of 17s. in 11. is practically solvent. Yes, more so. Every kind of security held by any bank, however good that security may be intrinsically, can only be realised at a great sacrifice, proving that with improved trade and the restoration of commercial matters to a normal condition, such banks are sound and healthy, and only need time to recover their proper status.

With reference to the important paper in last Saturday's *Journal*, referring to the manufacture of steel from the Cleveland ores, I may state that I have a sample of steel made by the process, which I have shown to several leading steel manufacturers in this district, and they all pronounce it to be of splendid quality, and equal to the best made at Sheffield. The invention is a grand one, and cannot fail to revolutionise the steel trade as regards economy of production and superior quality, and will also, no doubt, yield a rich harvest to the patentees, two of whom (Mr. W. Harrison and Mr. T. E. Jones) are residents here. Should the patentees decide on forming a company to take over the patents, no doubt the shares would soon be taken up. If the further experiments which will soon be tried and which involve some simplification and economising of the process, there can be no doubt but that the company will have practically monopoly of the steel trade—or, in other words, it will displace all existing processes on account of its cheapness and the incomparable quality of the steel which it can produce. Notwithstanding the continued depression of trade, strikes still prevail. Granting that exceptionally strikes may be useful, there appears a hasty determination on the part of men to strike instead of courteously and earnestly arguing all questions in dispute with employers. There is probably much to be said on both sides when disputes arise as to wages, but if mutual concessions were formed, such as are fairly warranted by the facts, I think a true solution of the difficulty would in all cases be found, without resorting to the desperate alternative of "strikes."—*Ulverston, Feb. 4.* WILLIAM SALMON.

#### WELSH GRANITE QUARRIES.

SIR,—Will you permit me to state, in reply to a paragraph in last week's report of your Correspondent for North Wales, Salop, and Cardigan, that the term Welsh granite has been well known to stone merchants throughout the kingdom—more especially those connected with the paving trade—for the last 20 years, and is intended, I presume, to distinguish it from the slippery kind of whinstone quarried at Penmaenmawr.

If your correspondent means to convey the idea that none of the stone quarried at the Carnarvon Bay district is of a similar kind as that found in Cornwall, Devon, Ireland, and Scotland, and used for building and ornamental purposes, and in which the three component parts—felspar, quartz, and mica—are nearly equally disseminated, his statements may be accepted as partially correct. The stone quarried at the principal quarries on the shores of Carnarvon Bay, however, is certainly not greenstone, one of the chief ingredients of which is hornblende, which fortunately does not appear in the stone of this district—small particles of talc, or black mica may sometimes be seen. The porphyritic and granitic rocks in this now famous quarry district so resemble the ordinary or common granite that their true designation would be properly defined by the term small, or fine grain granite. Your correspondent says, referring to Welsh granite quarries, that some of the best of them are situated near the town of Portmadoc. Now, this district is well known to me, and I am sorry to say that the stone in the district is a greenstone, in which the hornblende does appear very conspicuously.

There are three places where sett stones have been quarried; the most extensive is that near Minford, about three miles from Portmadoc. There are 26 sett makers employed, the owner of which is a Manchester contractor, the next is the Queen Quarry, belonging, your correspondent states, to Messrs. Slutchbury and Heathcote, and is two miles from Portmadoc shipping quay, and I was informed yesterday that there are only six sett makers employed. There are perhaps 100 or 120 tons of sett now at the bottom of the incline plans, none having as yet been shipped I was informed; yet your correspondent says it is about the best stone in North Wales. How he has been enabled to arrive at that conclusion I cannot say. The next quarry is situated on the opposite side of the mountain; here a considerable quantity of stone squared sets may be seen, and although the stone in my opinion is far superior to others in the neighbourhood on account of its not containing so much hornblende, yet all operations are at present suspended.

Anyone reading your correspondent's paragraph respecting Welsh granite quarries would infer that extensive quarrying operations were being carried on in the neighbourhood of Portmadoc, as it states that some of the best of them are situated near that town, where, as I learn, there are only 32 men employed manufacturing setts in the district as against (in the Carnarvon Bay district) nearly 50 at the Gwydwr, 35 at the Neven, 30 at the Tymawr, 160 or 170 at the Port Nant, 20 at the Cambrian, and about 400 at the Welsh Granite Company's quarries; these are all employed in the manufacture of setts, independently of the others contingent therefrom, and there are about 50 hands employed at the North Wales Granite Quarries. If your correspondent should be in this neighbourhood at any time, and could spare a day, I should be happy to drive him through the Carnarvon Bay quarry district. The stone worked at the Tymawr Quarries is certainly quite as much a granite as the rock known as Aberdeen Grey granite. EDWARD SPARGO.

Bangor, Feb. 6.

#### DISTRESS IN CORNWALL.

SIR,—Messrs. Bolton's letter, in the Supplement to last week's *Journal*, is looked upon as a step in the right direction. Unquestionably the distress in different parts of the county is beyond my power to describe. It is very painful to hear so much complaints and see the hardships and want before our eyes, and so many men day after day going in this direction and in that in search of work, and none to be got, while it is to be feared that not only them but many of their wives and families are in want of bread—in fact, such is the case, and almost naked in addition. Some efforts have been made privately here and there with a few friends to afford a little temporary relief by opening soup kitchens, supplying coal, &c., the whole being quite inadequate to meet requirements, and although public subscriptions have been spoken of for some time past by different parties, I am not aware that anything of the kind has yet been put into practice.

The suggestions contained in Messrs. Bolton's letter, when put into a practical form, are worthy of our united support. It cannot be denied that by providing employment for those now in want of it is the very best kind of relief, and the Cornish people do not wish to live on charity, but dislike the idea, and only desire that work may be provided whereby they may earn their own living, and money subscribed for this purpose can undoubtedly be judiciously spent. We are aware the prices of minerals are low at present, but there are fair prospects of better prices in a little time. It is now tolerably certain that minerals cannot be produced abroad for present prices, and consequently must fall off in quantity; and when trade revives, which we have reason to expect at no distant date, consumption must increase and prices go up, affording profitable employment for capital—in the meantime, something should be done for our miners.

There is plenty of new or unwrought mining ground in the county worthy of exploration, and known to contain productive lodes that with a small outlay might yield good results. Subscriptions spent in this way would be far better than distributing the same as alms, as there are the probabilities of labour yielding a far greater sum and affording permanent employment, and would be opening new works against the better times arrive, but even should it only afford employment until other works revive, it would answer the purpose in a great measure of the proposed scheme. There are many thousands of acres of waste land in Cornwall that without a doubt ought to be cultivated, and there is every reason to believe that landowners (for the purpose suggested) would grant very favourable leases, which would also provide much work, and prove remunerative as an investment.

If hundreds of thousands and even millions of pounds can be raised for the relief of those in a distant land, I sincerely trust we shall not be found wanting in efforts to relieve those of our own home who so sadly are in want of it at the present time. Let no one think their support may very well be done without, but let a strong organisation be formed and the best plans be laid for judiciously carrying out the most practical suggestions put forward, and my contribution shall be forthcoming.—*Helston, Feb. 3.* CORNWALL.

#### GOLD WASHING ON THE MAWDDACH.

SIR,—Your valued reporter for North Wales is quite correct as to the possibility of working the alluvial on the above river to a profit. The experiments made there last year in over a score of different places yielded practically uniform results, and proved that with careful and economical working a certain profit would be obtained by treating the alluvial for gold. In the particular place where these experiments were made the mine appears to have deserted its ancient bed and cut its way further to the west, leaving a strip of alluvial many scores of acres in extent, and, of course, containing many thousands of tons of soil. Several very promising veins are to be seen crossing the present bed of the river. It is a great satisfaction to see that Clogau Mine has yielded profit, and there are, no doubt, many other places where a similar profit could be obtained if only the same care and economy were exercised; but the richest gold deposits in the universe would not pay when financed on the same principle as the Gold Company, particulars of which lately appeared in your columns; or whereas, in other cases, scores of thousands of pounds have been spent on machinery which in many cases were useless, and in others were never erected, because the agents did not know how to put them up. X. Y. Z.

Dolgelley, Feb. 3.

#### MINING IN CARDIGANSHIRE.

SIR,—Notwithstanding the great gloom and dullness which pervades almost all industrial enterprise in England at the present moment, there are signs of revival in the great lead mining district of Cardiganshire. It is an undoubted fact that in years gone by many mines in this county were returning splendid profits to their adventurers. At the same time it must be admitted that for years past this has been the exception rather than the rule. In many instances this has, no doubt, been due to want of capital, and a consequent necessity to work the mines in anything but a miner-like way; in fact, to drag the mineral out anyhow, and to force sales of ore far in advance of the capabilities of the mines. The outside public seem to think that a good discovery of ore means immediate returns, forgetful, or, perhaps, unaware that it takes months to profitably lay open a course of ore for proper working. Another, and if anything a worse cause, is the enormous prices which are put upon mines in the first instance. In ordinary life one talks of and looks at 1000% with a certain amount of awe and respect, but in mining one seems to get into a fairland of Croesus. Men who seem to be on but poor terms with their tailors talk of thousands over a mine which, perhaps, consists of a couple of shallow adits and a few inches wide of lead in the forebreast of one of them; or some old mine which has laid idle for years is bought for a song, or, perhaps, obtained from the landlord for nothing, and speedily figures before the public as an extraordinary opportunity for realising a fortune, the whole of the purchase-money being taken in shares—say, 30,000%. For months most flaring accounts appear, during which the benevolent vendor gets rid of as many shares as he can, probably giving some mining broker 5s. in 11. for planting them. Any little cash capitalist is expended, and then there is a general break-up, and the process recommences again. There are mines in this county at the present time that have been worked by company after company for upwards of a century with the same result, and yet there are found people who will still go on. It must not be thought that such mines have been unproductive, because at times they produce ore sufficient to pay profit for a short time, but that shoot or course of ore gets worked out, and no search has been made for fresh deposits; again, some mines are situated in such positions in the hills that they cannot pay; the supply of water available for power is frozen three months in winter, or dried three months in summer, and to work engines in such positions is ruinous owing to the expense of carriage of coal.

There has been great havoc amongst the companies engaged in mining in Cardiganshire during the last five or six years, and a good many rotten things have been killed, but only for a time. They will make their appearance under some new and specious title



PARYS MOUNTAIN MINING COMPANY.

### OCCASIONAL CORRESPONDENT.

PARYS MOUNTAIN, AND MORFA DU.

AN OBSERVER.

### Meetings of Public Companies.

GLASGOW CARADON CONSOLIDATED COPPER COMPANY.

WHEAL BASSET.

The CHAIRMAN proposed that the statement of accounts be read and adopted, which was seconded by Mr. WADDINGTON, and carried unanimously.

Capt. R. H. WILLIAMS explained what he had done with reference to the past working of the mine, and pointed out that he had always strongly urged that the adventurers of South Frances ought to contribute towards Wheal Bassett water charges. He attributed the failure of those negotiations to the fact that Capt. Hoeking, Mr. Bassett's mineral agent, had reported that unless Wheal Bassett had not within itself elements of restoration, he did not consider it wanted any aid.

**MOLD ARGOED COLLIERY COMPANY.**—The seventh annual meeting of shareholders was held, on Monday, at the offices of the company. Mr. E. Bennock, the Chairman, presiding. In moving the

pany, Mr. F. Beacock, the Chairman, presiding. In moving the adoption of the report and accounts the Chairman expressed regret that, owing to the almost unparalleled depression in the coal trade, a loss on the year's operations had been made. The output in 1878 had been purposely decreased some 20,000 tons as compared with 1877, and every economy in the conduct of the company's affairs had been exercised. A full explanation of the accounts was given, and it was shown that during the past year capital account had been increased by some 700*l*. The Chairman added that it was intended to complete the sinking of the pit to the Cannel coal as early as practicable and if the seam was proved under satisfactory circumstances he hoped for good results from that source.—Sir Stephen Walcott, K.C.M.G., seconded the resolution for the adoption of the report and accounts, which was carried unanimously, and the retiring director and auditor having been re-elected, a vote of thanks to the Chairman terminated the proceedings.

THE SCOTCH MINING SHARE MARKET—WEEKLY REPORT  
AND LIST OF PRICES.

In shares of foreign copper and lead companies, the only movement is an advance of 8s. 9d. on Tharsis, which have sold between 21½ and 22. A favourable report has been received from New Quebrada; the output for November has been 950 tons, averaging 13 per cent. of copper, and three shipments had been made of in all 1600 tons. Cape are at 2½ to 30/; English and Australian, 22s. 6d. for tonna. 77s. 6d. Rio Pinto 5 new cent. 53½/; Konkio Bonita's, 2s. 6d. to 3s. 9d.

In shares of oil companies Uphall and Young's Paraffin are both 5s. per share higher. Young's Paraffin have been firm, between 13¼ and 14, all the week. Runcorn Soap and Alkali are at 9 dis.

In shares of miscellaneous companies Phospho-Guano are 15s. lower, at 7½. At the meeting, to-morrow, of the Cheshire Amalgamated Saltworks a dividend of 12s. per share, being at the rate of 3 per cent., will be recommended for the year 1878, carrying a reserve balance of £3,591. No dividend was paid in the previous year. Inside, Engineers, &c., of 7s. 6d. for the Leuchpatrick Asphalt, United Limmer Asphalt, 22s. 6d. In wagon companies shares there is little doing. The Yorkshire Railway Wagon Company's dividend is to be 8½ per cent., carrying forward 758½; last year 10 per cent. was paid. Birmingham are 14 Bristol and South Wales, 7; Bristol, 40 dis.; Gloucester, 7; Lancaster, 80s.; Leeds, 45s.; London, 45s.; Manchester, 40s.; Newcastle, 80s.; Newfield, 25s.; North Western, 6s. Shares of chemical companies fall. Langdale are at 9s. to 92s. 6d.; Lawes, 8s. to 8½; and Newcastle, 20s. to 30s.

**MWYNDY IRON ORE COMPANY (Limited).**—The report of this company, to be submitted to the meeting on Feb. 12, shows a loss on the past year's working of 108%. Referring to the new property at Treacastle, it is said to look most promising, and the quality of the ore raised is superior to that from the Mwyndy. Nothing definite is stated as to the dividend likely to be received on the debt due by the Llynvi, Tondy, and Ogmore Coal and Iron Company, but it is said to be in progress of reconstruction.

GLASGOW CARADON CONSOLIDATED COPPER MINING COMPANY (Limited).—At the meeting of this company, on Monday, the reports and accounts, of which an epitome was given last week, were adopted, and the sum of 100% voted to the directors for their services for the year. The Chairman expressed regret that for one year they should be omitted from the list of dividend paying mines. They were one of the very few mines able to pay expenses and to go on with a small profit, but did not declare any dividend in order to keep the financial position straight. Early last year they resolved, in consequence of prices continuing so low, to reduce the output, which they had done to the extent of 274 tons over 1877. Their lessees' profits are, therefore, neither due to falling off in the quantity of mineral or its richness, but entirely to the low price of copper. What the future would be no one could tell, but they all hoped their profits would be greater than ever when times improved. Everything is going on well at the mines, and the development of the 102 is expected to lead to a good result.

MARBELLA IRON ORE COMPANY (Limited).—The report of this company for last year states the depression in the iron trade has increased and rendered profitable business almost impracticable. Their funds were all in the City of Glasgow Bank, and though it is expected they will all be recovered, with interest, they are meanwhile only able to get an advance to the extent of one-half of their funds from another bank; but this will be sufficient to enable the company to carry on its business. The accumulated stocks of ore have depreciated 34 1/2% in value from exposure to the weather for several years; but precautions have been taken to prevent such a loss again. During the latter half of the year, when work was carried on, the output of ore was 11,846 tons, and the estimated quantity of deads removed 41,000 tons. In consequence of this small production the cost per ton has been heavier than usual. The shipments were 21,900 tons. Next year more satisfactory results may be expected, as a new arrangement has been concluded with Messrs. Heddle and Company, of Glasgow, the promoters of the adjoining mines, for a lease of their property for a term of years, on royalty which will enable the Marbella Company to turn out a large quantity of rich ore at a moderate rate.

The following calculations show the yield per cent. on money invested at present prices in the shares named, based upon the last average yearly dividends being maintained:—In coal and iron companies, Arnoton would yield 12½; Blackow, Vaughan, A. 7½; Cairntrable, 14½; and Muntz's Metal, 7½. In oil companies, Dalmen; would yield 5½; Oakbank, 8½; Ditt: (new), 7½; Uphall, 3½; and Young's Paraffin, 10½. Phospho Guano would yield 6½; Price's Patent Candles, 7½; Scottish Wagon, 6½; Ditt: (new), 6½; Tharsis Mine, 8½; Ditt: (new), 8½; and United States Rolling Stock, 4½.

**BENHAR COAL COMPANY (Limited).**—After a conference with the largest creditors of this company, the chairman published the names of the gentlemen thus approved of to be offered for election as new directors, and intimated that the action of the creditors towards the company was very satisfactory. A statement has been

made up from the books showing the gross profits in November and December last were 7224/. From this there would fall to be deducted interest on debts (say) 2500/., leaving 4724/ as the net profit available for paying dividends and providing for depreciation. While these are two of the best months of the year, it has also to be kept in mind that the company has been working

under the disadvantages incidental to provisional liquidation, [that the Abercrombie works have not been in operation at all, and that wages were for most part of the time at a higher rate than now prevails. Taking all these matters into account, and the unexampled universal depression in mining industries, the result of the working is highly satisfactory. The directors are glad to report that about 100,000*l.* of the company's obligations have been arranged in the form of debentures.]

be ultimately new shares being subscribed for 100,000.

At the meeting of this company on Wednesday the resolutions agreed to at the previous meeting to issue new  $\frac{1}{4}$  per cent. preference stock were unanimously confirmed, and the appointing the directors, as proposed, the meeting adjourned.

In the course of the remarks, the chairman said the company was at present due to debenture-holders with interest, the sum of 28,000*l.*, and they had got agreements to defer payment of 19,500*l.* of this. That left a balance of 8500*l.*, of which 3400*l.* will be renewed conditionally, so that they had at present only to repay 5100*l.* As regards the creditors, the total liability was 45,893*l.* Landlords had agreed to withhold 8074*l.* of this, and free creditors a further sum of 10,000*l.*, with additional promises of about 2000*l.* That left something like 26,000*l.* to be provided for. They had, however, assurances from two creditors representing nearly 14,000*l.*, that they would also withhold their claims if the arrangement for subscribing preference stock was carried out. They had, therefore, only about 9000*l.* to 12,000*l.* to pay, and even that not necessarily at once. He thought it would be better to sell the Duddington estate, the Abercrom brickworks, and the oilworks, when they would be left with only about 30,000*l.* of debt. The amount of preference stock already subscribed for is 33,000*l.*, and it is absolutely necessary for all shareholders to take some more at once.

Capital.		Dividends.		Description of shares.		Last price.	
Per share.	Paid up.	Rate per cent.	per annum.				
£ 10	£ 48	Previous.	Last.				
10	10	£ 7 1	£ 5	COAL, IRON, STEEL.			
10	10	—	—	Aarnston Coal (Limited) .....		90s.	
10	10	—	—	Benhar Coal (Limited) .....		35s. 6d.	
10	10	5s. 1d.	2s. 6d.	Bokow, Vaughan, and Co. (Lim.) .....		54s.	
10	10	10	10	Calrntable Gas Coal (Limited) .....		63s.	
10	10	4s.	April, 1876	Chillington Iron (Limited) .....		47s. 6d.	
10	10	—	—	Clyde Coal (Limited) .....		40s.	
10	10	10s. Dec., 1874	—	Ebbw Vale Steel, Iron, and Coal (Lim.) .....		80s.	
10	10	—	—	Fife Coal (Limited) .....		47s.	
10	10	nil	nil	Glasgow Port Warrington Iron & Coal (L) .....		47s.	
10	10	—	—	Ditto Prepaid .....		35s.	
10	10	—	—	Lochoe and Caple Rae (Limited) .....		40s.	
10	10	—	—	Marbella Iron Ore (Limited) .....		20s.	
10	10	nil	nil	Monkland Iron and Coal (Limited) .....		16s.	
10	10	—	—	Ditto Dividend Preference .....		40	
100	100	nil	nil	Nant-y-Glo & Blaen-y-iron pref. (L) .....		30	
6	6	nil	nil	Omoo & Cleland Iron & Coal (L. & Red.) .....		2s. 6d.	
1	1	15	15	Scottish Australian Mining (Lim) .....		32s. 6d.	
1	10s.	15	15	Ditto New .....		15s.	
Stock	100	nil	nil	Shotts Iron .....		60	

COPPER, SULPHUR, TIN.						
4	...	4	...	Canadian Copper and Sulphur (Lim.).....	5s.	
10	...	7	72½ 6½	Cape Copper (Limited).....	30	
1	...	7	7½	Glasgow & Carado Copper Limited.....	30	
1	...	15s.	7½	Ditto New.....	13s. 6d.	
10	...	9¾	nil	Huntington Copper and Sulphur (L.).....	12s. 6d.	
4	...	4	...	Panullico Copper (Limited) .....	20s.	
10	...	10	6½	Rio Pinto (Limited).....	52s. 6d.	
20	...	20	7	Ditto, 7 per cent. Mortgage Bonds.....	13½	
10	...	100	8	Ditto, 6 per cent. Mortgage Bonds.....	13½	
10	...	7	20	Tharsis Copper and Sulphur.....	21½ 18s.	
10	...	7	20	Ditto New.....	14½	
1	...	1	...	Yorke Peninsula Mining (Limited).....	5s.	
1	...	1	...	Ditto, 15 per cent. Guaranteed Pref. ....	15s.	

GOLD, SILVER.											
1	5	1	5	—	—	—	—	—	—	Australian Mines Investment (Ld.) ...	5s.
5	5	5	30s.	—	10s.	1	—	—	—	Richmond Mining (Limited) .....	8s.
OIL.											
10	—	7	5	5	5	—	—	—	—	Dalmay Oil (Limited) .....	6½
1	1	1	25	—	15	—	—	—	—	Oakbank Oil (Limited) .....	35s.
1	1	5s.	—	—	15	—	—	—	—	Oil (Limited) .....	11s.
10	10	—	7½	—	—	—	—	—	—	Uphall Mineral Oil (Ld.) .....	8½
10	10	—	—	—	—	—	—	—	—	Ditto "B" Defted .....	11
10	10	8½	—	17½	—	17½	—	—	—	Young's Paraffin Light & Mineral Oil (Ld.) .....	10

MISCELLANEOUS.									
50	...	25	...	5	...	6	...	London & Glasgow Engineering & Iron Shipbuilding (Limited)	21
7	...	7	...	10	...	5	...	Phospho Guano (Limited)	74
10	...	10	...	6	...	6	...	Scottish Wagon (Limited)	94
10	...	4	...	6	...	6	...	Ditto New	77.

NOTE.—The above lists of mines and auxiliary associations are as full as can be ascertained, Scotch companies only being inserted, or those in which Scotch investors are interested. In the event of any being omitted, and parties desiring a quotation for them and such information as can be ascertained from time to time to be inserted in these lists, they will be good enough to communicate the name of the company, with any other particulars as full as possible.

## FOREIGN MINING AND METALLURGY.

The attendance at the last meeting of the Brussels industrial Bourse was large, but it must not be inferred from this that there was any increase in the amount of business done; on the contrary the larger the attendance the more the complaints. There is, indeed, scarcely any serious business passing in the Belgian iron trade except the adjudications of the Government for the Belgian State Railways. A special office is to be established by the Belgian Minister of Public Works, for the purpose of affording the public information in regard to adjudications. When a notice to this effect was made to the Chamber of Deputies, M. Coumons, one of the deputies, asked that in future the adjudications of contracts on the part of the Government should be of a serious character, and that the lowest tender should be accepted in each case. The Minister of Public Works replied that this rule would be followed except under circumstances likely to be generally approved. The *matériel* which the Administration of the Belgian State Railways has collected for the laying of permanent way upon the Hilf system corresponds to a length of 78 miles. Almost all the sections upon which the new permanent way is to be laid have a heavy traffic; they have also sharp curves and severe gradients, so that for good or for evil the new system will now be thoroughly tested. The Administration of the Belgian State Railways is also about to make a trial of iron permanent way upon the Serres and Battig system. The *matériel* required for laying the system upon rather more than half a mile of line has now been collected. At an adjudication which has taken place this week for water-pipes required for the Municipality of Brussels the lowest tender for pipes of small diameter was 5*l.* 6*s.* 6*d.* per ton. and for pipes of larger diameter 5*l.* 11*s.* 3*d.* per ton.

It may be interesting to note that an American locomotive has recently arrived at Geneva. It being considered desirable to utilize the anthracite coal of the Valais, it was deemed advisable to import an American engine, as locomotives made in France and Switzerland would not consume the coal in question. The American engine, which has been received at Geneva, has worked satisfactorily.

Good news has been so scant of late in the Belgian coal trade that one piece of intelligence has been very eagerly welcomed. This week the Paris General Company for Lighting and Heating by Gas, which a great consumer of coal, and which was formerly an important client of the Mons basin, declined to use any more Belgian coal after the coal famine of 1871-72. The company was not satisfied with the manner in which certain Belgian firms had executed the contracts entrusted to them, and hence the policy of ostracism which was adopted. We now learn, however, that this ostracism has been removed, and that the company is about to give out orders to several Belgian collieries. The return of so important a client to Belgium has necessarily been a subject of much rejoicing among Belgian coalowners.

Although the weather has somewhat improved at Paris the temperature has still been low, and the Paris coal market has ruled active in consequence. As the coal merchants think that the winter is still far from over they have continued to give out orders with a certain freedom for domestic qualities of coal. The demand for industrial descriptions is, however, still very dull; thus there is very little demand in the Nord and the Cas-de-Calais on the part either of the iron trade or the proprietors of sugarworks. In the basin of the Loire the coal trade has also been somewhat dull.

An interesting light is thrown upon the arguments of the ironmasters examined before the German Commission of Enquiry by the statements made by the French ironmasters before the recent French Commission. The present chief proprietor of the great ironworks of Schneider and Co. at Creuzot, M. Schneider, stated before the last-named Commission that before the Franco-German war he made a tour of inspection round the German iron and steel establishments and was convinced thereby that within ten years from that time German competition would be more dangerous to the French iron industry than English competition. Since that time German competition has been greatly feared at Creuzot, and earnest efforts have been made to prepare for and withstand it. Nevertheless the Schneider works, which for technical excellence stand in the first rank, have seen their exports decline from 22,000,000 frs. in 1875 to 15,000,000 frs. in 1876, and 7,000,000 frs. in 1877. M. Schneider attributes this decrease chiefly to the fact that the cost of land carriage of the Spanish ore from the French ports to his furnaces was from



12 frs. 15c. to 18 frs. per ton, while the cost of carriage by water along the Rhine to the German Bessemer works was only 4 frs. 50c. to 5 frs. M. Jordan also, a director of the Blast Furnace Company at Mar-selles, stated that the total cost of the Spanish ore delivered at Krupp's furnaces in Essen was from 25 frs. to 26 frs. per ton; and he added that by means of good and cheap coke it was possible at Krupp's works to turn out a ton of Bessemer pig-iron for 65 frs. to 70 frs. and a ton of steel rails for 130 frs. first cost (equal to 104 marks or 61.4s.) It is noteworthy, says the Allgemeine Zeitung, that the representative of Krupp's firm before the German Commission declined to give any information as to cost of production. The other German rail manufacturers examined estimated their cost of production at 128 marks (81.6s.) per ton, exclusive of general expenses.

### Registration of New Companies.

The following joint-stock companies have been duly registered:—

**LLANDESLA MINING COMPANY (Limited).**—Capital 15,000*l.*, in shares of 1*l.* The acquiring by purchase or otherwise mines and minerals under certain lands known as Bodidris Llanarman, Flint, and the rights and privileges belonging thereto, together with the plant, machinery, and effects thereon, and any other lands, mines, and minerals in the county of Flint and elsewhere. The purchasing, erection, or taking upon lease smelting works, mills, machinery, &c., for the purpose of carrying on mining and smelting operations in connection with the lands belonging to the company. The subscribers (who take one share each) are—W. B. Stephens, Tottenham, gentleman; C. J. Biggs, 7, King William-street, accountant; Joseph Viet, 26, Moorgate-street, stock and share dealer; V. Campbell, 26, Moorgate-street, stock and share dealer; T. Miller, 29, Manor-road, publisher; R. Bagnall, 19, Radnor-street, Peckham, clerk; E. H. Lore, 13, Coleman-street, stationer. Qualification of directors, 100 shares each.

**NEWMARKET COLLIERIES, BRICK WORKS, AND POTTERY COMPANY (Limited).**—Capital 25,000*l.*, in shares of 5*l.* The acquiring of an agreement between F. H. Watson, of the one part, and H. S. Simester for the company, all collieries, brick, pottery, and fire-clay works, lands, and premises, known as the Newmarket Collieries, Fire-Brick, and Sanitary Tubeworks, in Adwalton, Yorkshire; together with the goodwill of the business as carried on by F. H. Watson, and all the plant, engines, wagons, machinery, and implements belong to the said collieries and works, and the whole of the stock-in-trade. To work, explore, develop, and maintain the collieries, mines, and mineral properties of the company. The subscribers (who take one share each) are—H. W. Wheeler, 19, Queen Victoria-street, actuary; H. S. Simester, 2, Little Bush-lane, secretary; G. Nye, 101, Wyndham-road, Camberwell, gentleman; W. A. Bennett, 19, Studland-street, Hammersmith, gentleman; C. Bennett, 19, Studland-street, civil engineer; F. T. Large, 11, St. Peter's-square, Hammersmith, accountant; T. Semper, 14, Queen Victoria-street, housekeeper. The first directors shall be—the Hon. Major Jocelyn, 54, Walton-street, S.W.; the Hon. James Tobin, 14, Alexander-square, S.W.; George Broadbridge, 4, Rumford-place, Liverpool; T. H. Watson, Batley, Yorkshire; H. W. Wheeler, 21, Victoria-street; and J. Wilkinson, New Park Street Mills, Leeds.

**DUNSTALL HALL PARK COMPANY (Limited).**—Capital 55,000*l.*, in shares of 10*l.* To purchase or otherwise acquire lands near Wolverhampton known as Dunstall Hall Park. The constructing and erecting a race course for races, or for the drilling and reviewing of troops, or for games, public fairs, &c., and the carrying on the business of race proprietors. The subscribers (who take one share each) are—J. Percival, 12, Clarence-terrace; J. Johnson, 25, Harrington-square; E. Woodland, Finchley-road; F. G. Hobson, Raleigh Club; C. Bush, 411, Kingsland-road; C. H. Ashley, Sportsman Office; J. Capp, 314, Kennington-road.

**PORTMADOC BRICK, CLAY, AND PEAT WORKS (Limited).**—Capital 75,000*l.*, in shares of 5*l.* To adopt an agreement between E. J. Barnard and W. A. Bickles for the sale and purchase of G. M. Barnard's interest in the premises, machinery, plant, rights, &c., therein referred to. To purchase or acquire any lands, mineral, or other properties adjoining. To work and develop the business and works belonging to the company. The subscribers (who take one share each) are—A. S. Winn, 54, King William-street; E. Jones, 24, Fenchurch-street; J. Pass, Bow; G. G. Brathwaite, 50, Lime-street; C. E. Stuart, 66, Old Broad-street; H. R. Allen, Acton; W. H. Gunningham, Dalston.

**WILLIAMS, THOMAS, AND DAVER (Limited).**—Capital 100,000*l.*, in shares of 10*l.* To purchase and acquire the goodwill, stock in trade, machinery, plant, and assets of the business of chemical and aniline dye manufacturers, now carried on by Williams, Thomas, and Daver, together with all rights belonging thereto, and to carry on the business of chemical and aniline dye manufacturers. The subscribers (who take one share each) are—G. M. Forman, 59, Mark lane, merchant; R. D. Smythe, 32, St. Mary Axe, merchant; G. Smythe, 72, Abingdon-road, general agent; C. G. Williams, Wandsworth, chemical manufacturer; E. G. P. Thomas, Hammersmith, chemical manufacturer; J. Daver, Brentford, chemical manufacturer; T. Liston, 41, St. Mary Axe, merchant.

**THE NEW BREWERY COMPANY, CARLISLE (Limited).**—Capital 36,687*l.*, in shares of 7*l.* The carrying on at Carlisle and elsewhere the business of malsters and brewers. The subscribers are—G. Mounsey, Kingfield, 1150; T. W. Jackson, Carlisle, and J. Monkhouse, Church Oakley, jointly, 1187; W. Pattinson, Carlisle, 740; T. W. Jackson, Carlisle, 710; J. Monkhouse, Church Oakley, 665; M. Falcon, Stainbourne, 330; J. B. Westray, London, 271; T. S. Newby, Maryport, 67; H. A. Hall, London, 50; T. Younger, Plaistow; Isabella Younger and Margaret Scott, jointly, 33.

**TOOTING LAND COMPANY (Limited).**—Capital 5000*l.*, in shares of 5*l.* To purchase in the name of G. Pennington Jay, as a trustee of the company for 8500*l.*, a freehold building estate at Tooting, consisting of shops, dwelling houses, &c., and to sell, let, lease, or exchange, and otherwise deal with said property. The subscribers are—E. Evans, Brixton, 24; J. C. Harding, Forest Gate, 1; W. Dedman, Tooting, 5; J. Freeman, Maldon, 20; A. Freeman, Maldon, 20; G. Pennington, Maldon, 11; W. Crick, Maldon, 1.

**ALDERSHOT BREWERY COMPANY (Limited).**—Capital 10,000*l.*, in shares of 5*l.* The brewing and sale of porter, stout, ale, and other malt liquors at Aldershot. The subscribers (who take 50 shares each) are—J. T. Westroff, Farnham; G. Douglas, Aldershot; C. Wren, Aldershot; E. Martin, Aldershot; George Wells, Aldershot; H. Wells, Aldershot; W. Clinton, Aldershot; J. Hickley, Farnham; W. T. Coleman, Farnham; J. Wasby, Aldershot; R. Stone, Aldershot.

**SWANSEA COFFEE PUBLIC HOUSE COMPANY (Limited).**—Capital 10,000*l.*, in shares of 1*l.* To acquire and maintain in Swansea and neighbourhood, refreshment houses or taverns at which alcoholic liquors shall not be sold, and to carry on the business of refreshment house and tavern keepers. The subscribers (who take 20 shares each) are—S. C. Morgan, Swansea; J. G. Gauntlett, Swansea; S. B. Power, Swansea; J. Padden, Swansea; F. E. Williams, Swansea; R. Glascombe, Swansea; R. G. Cawker, Swansea.

**WILLIAM WILKINSON AND COMPANY (Limited).**—Capital 6000*l.*, in shares of 10*l.* To purchase or otherwise acquire land with foundry, workshops, and other buildings thereon in Wigan, Lancashire, and the business heretofore carried on by W. Wilkinson, as an engineer and ironfounder, together with the engines, boilers, machinery, &c. To carry on and promote the same business in the same manner as it now is, and has been. The subscribers (who take one share each) are—S. Taylor, Wigan, cashier; A. Crossley, Wigan, clothier; Ralph Hough, Wigan, boiler-maker; Richard Hough, Newtown, boiler-maker; Thomas Margeson, Wigan, cashier; W. Wilkinson, Wigan, engineer and ironfounder; G. Pollard, Liverpool, tool dealer.

**SOUTHERN MARINE PALACE COMPANY (Limited).**—Capital 70,000*l.*, in shares of 5*l.* The purchase of ground close to Southend, and establishing thereon a promenade, palace, refreshment rooms, theatre, reading, concert, and billiard rooms, club, aquaria, &c., and providing all kinds of indoor and outdoor amusements for the public. The subscribers are—C. Bischoff, 23, Westbourne-square, 50; J. Lordan, 28, Queen-street, 50; R. H. Stewart, 85, Eaton-square, 50;

W. Wright, 304, Camberwell-road, 50; G. Donnison, 20, Wormwood-street, 1; W. J. Marshall, Southend, 50; Isidore H. Stuart, Walthamstow.

**W. R. PALMER (Limited).**—Capital 10,000*l.*, in shares of 10*l.* The manufacture and sale of malleable and other iron goods, and the purchase and sale of such other articles as may be advantageously sold therewith, and the doing such other things incidental or conducive to the attainment of the above subject. The subscribers (who take one share each) are—W. B. Baker, Birmingham, manufacturer; E. Cartor, Birmingham, accountant; W. F. Cartor, Edgbaston, law student; E. H. Cartor, Birmingham, accountant; G. E. Fletcher, Birmingham, manufacturer; C. H. Allison, Birmingham, stock and share broker; C. G. Smyth, Moseley, clerk. The directors to be Messrs. Baker, E. Cartor, and E. H. Cartor until they shall cease to hold a majority of the company's shares. The remuneration of the directors shall be determined by the company in general meeting.

**EXETER COFFEE TAVERN COMPANY (Limited).**—Capital 10,000*l.*, in shares of 1*l.* To establish houses, rooms, street-stalls, shops, and refreshment bars in and about Exeter or neighbourhood, in which no ale, wine, or spirituous liquors shall be sold, and to carry on the business of general refreshment and lodging-house keepers. The subscribers are—C. Avery, Exeter, 10; W. Brock, Exeter, 20; W. Cotton, Exeter, 10; E. Dunville, St. David's Hill, 10; W. Drayton, Exeter, 20; R. Wymond, Exeter, 10; W. H. Ellis, Exeter, 20; G. Franklin, Exeter, 10; E. T. Fulford, Exeter, 10; L. J. Kennaway, Exeter, 15; M. G. King, Exeter, 25; G. C. Kingdon, Exeter, 10; S. Steer, Exeter, 10; S. Ward, Exeter, 20; C. Westron, St. David's, 20; J. W. Wilson, Exeter, 10; W. Webb, Exeter, 10.

**DIAMOND FUEL COMPANY.**—On Saturday a petition was presented to Vice-Chancellor Malins for winding-up this company, which was formed in January, 1873, for working certain patents for making artificial fuel and for granting licences for the use of the patents. When the case came on in November last a preliminary objection was raised, which was overruled. The petition was again before the Court on Dec. 14, when it was ordered to stand over to give an opportunity to Mr. Metcalfe, who was alleged to be a person intimately acquainted with the details respecting the formation of the company, to give evidence as to certain charges made against the promoters and directors of the company. Mr. Metcalfe not having appeared when the case was called on, the Vice-Chancellor made the usual order for winding-up the company. Mr. Glasse, Q.C., and Mr. C. H. Turner, Mr. Higgins, Q.C., and Mr. Whitehouse, Mr. J. Pearson, Q.C., and Mr. Farwell, Mr. Bristowe, Q.C., Mr. Macnaghten, and Mr. Everitt appeared for the different parties interested.

**STANHOPE SILKSTONE COAL COMPANY.**—Mr. Glasse, Q.C., and Mr. Everitt moved before Vice-Chancellor Malins for the appointment of a provisional liquidator of this company, and for an order to restrain the Sheffield Wagon Company from proceeding under a garnishee order against a debtor of this company. Mr. Levett appeared for the company, and consented to the application. The Vice-Chancellor made the order, and appointed Mr. Shoesmith to be the provisional liquidator, who was to carry on the business of the company as a going concern until further order.

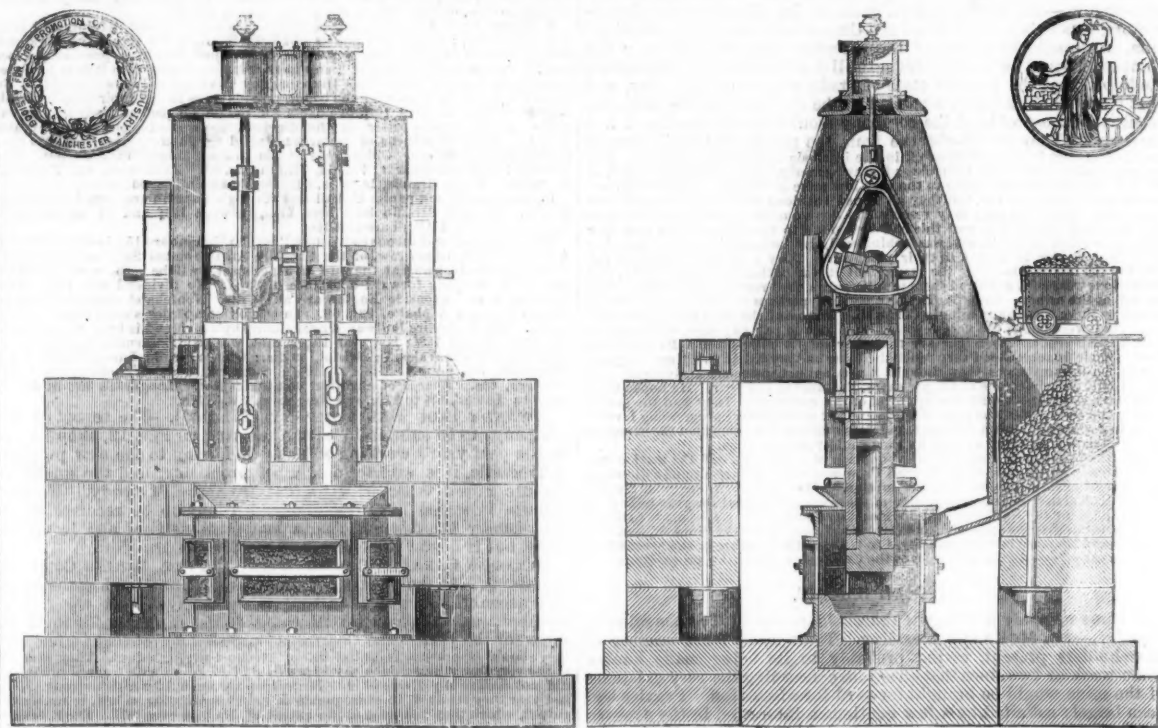
**FLAGSTAFF SILVER MINE.**—Two petitions presented against the Flagstaff Silver Mining Company of Utah, the affairs of which have often been reported in the law courts owing to the pending litigation entailed by the attack upon the mine and its alleged worthlessness.

ness, came on for hearing before the Master of the Rolls (Sir George Jessel) on Monday. After some conversation the petitions were ordered to stand over.

**ROSEDALE AND FERRYHILL IRON COMPANY (Limited).**—A petition for winding-up this company was in the paper for hearing before the Master of the Rolls on Monday, but on its being called on Mr. Chitty, Q.C., who appeared for the petitioner, said that an arrangement had been made by which the parties agreed that the hearing should stand over till next petition day (Monday). He understood that the company appeared and consented to that.

**CUTTING SHEET METAL.**—For the purpose of cutting sheet metal to the sizes required, the sheets of metal as they come from the rolls are, according to the invention of Mr. M. W. JOHNSON, of Limehouse, accumulated upon a truck fitted with a movable top until a pile of several inches in thickness is built up. The truck with the pile upon it is then run away to the cutting machine, which consists of a pair of standards with guides in which a guillotine knife is capable of being worked up and down by eccentrics actuated by manual labour, or in other convenient manner. Immediately beneath the knife there is a strong cross bar or girder to resist its downward pressure. In front of the knife also a carriage is arranged; it is able to move to and from the knife along guide rails, and on the carriage there is a table capable of being turned around a pivot or centre. The truck bringing the pile of sheets to the cutting machine is stopped when the movable top of the truck is passed on to the pivotted table of the carriage. The movable top is now supported on movable rails and these are caused to descend, leaving the movable top resting flat upon the pivotted table. The carriage is now moved forward along its guides so that its fore end enters beneath the knife, passing just clear of the cross bar or girder already mentioned, thus carrying the pile of sheets into such a position that the knife will descend on to it at the place where the cut is desired to be made. When the knife descends the cut is made, the fore part of the carriage being sustained by the cross bar or girder. After each cut the carriage is drawn back, the table is turned round on its pivot, and then is again placed beneath the knife in position for another cut, and so on until all the four sides of the pile have been acted upon.

**LETTERPRESS PRINTING INVENTIONS.**—During the nine years ending 1866 invention connected with letterpress and similar printing (excluding electro-telegraphic and photographic printing) was certainly very active, for the volume of Abridgments of Specifications of this class, the second edition of which (Part 2, A.D. 1856-1863, price 2s. 6d.) has just been issued by the Commissioners of Patents, extends to no less than 382 pages. During the period embraced by the series some of the most important improvements of the century, especially as regards rapid machinery, have been introduced so that the study of them will be particularly interesting. There are the inventions of Applegath and Hoe, which may be regarded as marking a new era in machinery; and several of the composing machine patents, which although of limited utility—inasmuch as it is impossible to endow a machine with human intelligence, much less with the almost superhuman intelligence requisite to decipher the enigmatic scribbling and guess the probable meaning of many authors—are highly ingenious and very useful for certain purposes, as for reprints and the like. The volume is altogether a very interesting one for members of the printing trade, who by observing the causes of failure of previous inventors may be able to devise effectual remedies.]



## SHOLL'S PATENT DIRECT-ACTING PNEUMATIC STAMPERS,

For Pulverising Tin and Lead Ores, Gold Quartz, &c.,

SOLE MAKERS FOR CORNWALL,

**N. HOLMAN AND SONS,**

ST. JUST FOUNDRY, NEAR PENZANCE, CORNWALL.

ROTARY STAMPERS SUPPLIED ON THE SAME PRINCIPLE, ALSO WITHOUT STUFFING BOXES OR GLANDS, WHERE RUNNING GEAR EXISTS, OR WITH HORIZONTAL CONDENSING ENGINES AND BELTS TO DRIVE THEM, IF PREFERRED.

Also, SOLE MAKERS OF STEPHENS' PATENT PULVERISER. MINING AND OTHER MACHINERY CONSTANTLY ON SALE, NEW AND SECOND-HAND.

## Electric-Bell Signals for Collieries, Factories, Warehouses, &c.,

WITH OR WITHOUT GALVANIC BATTERIES.

NEW SYSTEM—CAN BE RUN AT ANY PART OF THE ROAD. Cheap, safe, and reliable. Efficiency guaranteed. LINES OF TELEGRAPH erected and maintained. LIGHTNING CONDUCTORS, &c.

For estimates and particulars apply to—

**SYDNEY F. WALKER,**

LATE G. E. SMITH,

TELEGRAPH ENGINEER

COMMERCIAL BUILDINGS LONG ROW NOTTINGHAM



Awarded Gold Medal, Paris Exhibition, 1878.

# HADFIELD'S STEEL FOUNDRY COMPANY,



FIRST PRIZE MEDALS AT LEEDS, MANCHESTER, AND  
WREXHAM EXHIBITIONS, 1875 AND 1876.

ATTERCLIFFE, SHEFFIELD,

DEVOTE THEIR EXCLUSIVE ATTENTION TO THE MANUFACTURE OF

CRUCIBLE STEEL CASTINGS,

FOR

Engineering & Mining Purposes,

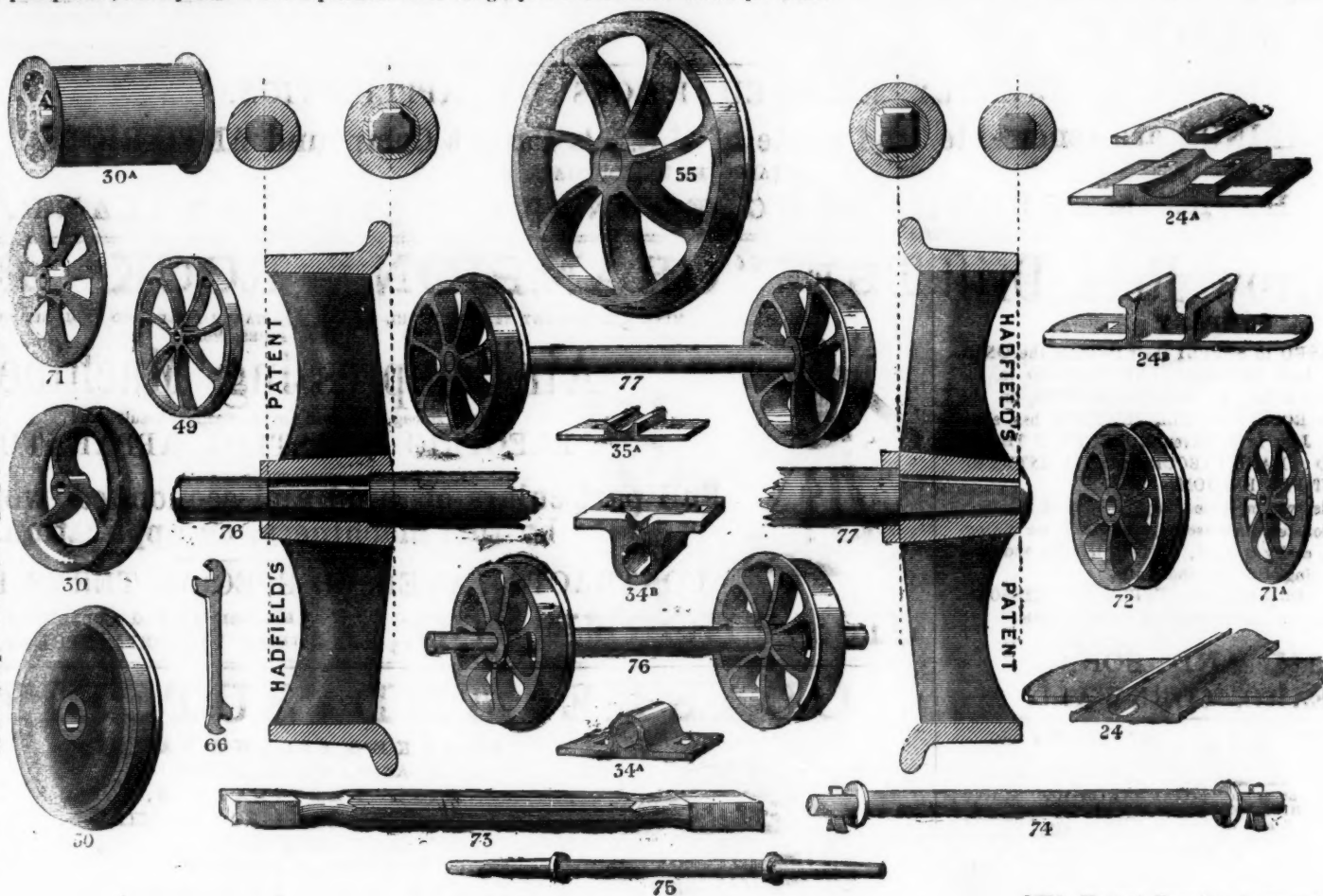
AND ARE THE SOLE MAKERS OF

HADFIELD'S CRUCIBLE STEEL WHEELS.

One of our departments is specially adapted for the manufacture of these Wheels (as shown below), for Collieries, Ironstone Mines, Slate Quarries, Ironworks, Lead Mines, &c., &c. We have made, and are now making, many HUNDRED THOUSANDS; and having Patented a New Method of Fitting Wheels upon axles, being cheap, effective, and expeditious, we can execute orders entrusted to us with promptitude, our capacity in this department alone being equal to about 2000 wheels per week.



N.B.—Prices per Set of Wheels and Axles, fitted complete, forwarded on receipt of diameter of wheel on tread, depth of tread, real gauge, and thickness of axle and rolling load.



[This Sheet of Drawings is Copyright.]

## HADFIELD'S PATENT METHOD OF FITTING WHEELS UPON AXLES.

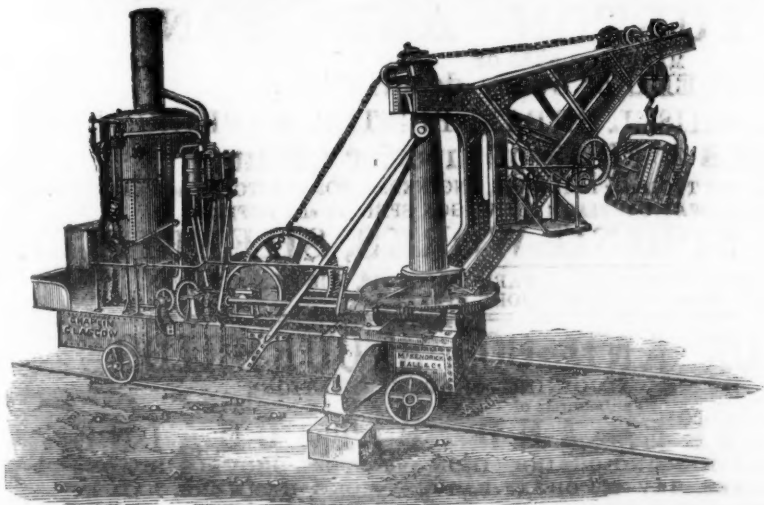
The advantages of the above system are that the Wheels being forced upon a Taper Square-ended Axle, by Machinery, and then riveted (the machine securing truth), it is impossible that they can come loose or get within gauge. They are very heavily fitted on, and run exceedingly true.

We construct the Arms of wheels upon the curved principle (as shown in the drawings above), consequently the shrinkage or cooling of the Castings is not interfered with, thus securing the greatest advantages of our very strong material.

CRUCIBLE CAST-STEEL WHEELS, when cast by us, are made from one-third to one-half lighter than Cast-Iron. They cannot be broken while working, even with rough usage, and will wear at least twelve times as long as Cast-Iron, thus saving animal and steam power, and reducing wear and tear immensely.

We would also draw special attention to our INCLINE PULLEYS and CAGE GUIDES, the adoption of which will prove highly advantageous.

## CHAPLINS' PATENT IMPROVED STEAM EXCAVATOR OR "NAVY."



The Illustration shows our general arrangement, and the ordinary mode of working of this valuable Labour-saving Machine.

It is made exceptionally strong in all its parts, wrought-iron and steel being largely used in its construction; and we can confidently refer to a number we have made, now working in various parts of the country Dock-making, Railway-making, Excavating generally, with the greatest success.

STEAM CRANES, HOISTS, PUMPING ENGINES,  
LOCOMOTIVES, STATIONARY ENGINES,

AND OTHER OF OUR

CHAPLIN'S PATENT STEAM ENGINES AND BOILERS

ALWAYS IN STOCK OR IN PROGRESS.

PATENTEES AND SOLE MANUFACTURERS:

ALEXANDER CHAPLIN AND CO.,

Cranston Hill Engine-works, Glasgow.

London House: M'Kendrick, Ball, and Co., 63, Queen Victoria Street, London, E.C.



At the PARIS EXHIBITION the Jurors have Awarded

# THE GOLD MEDAL, THE SILVER MEDAL, AND HONOURABLE MENTION

FOR MY LATEST PATENTED STONE BREAKERS AND ORE CRUSHERS.

Stones broken equal, and Ores better, than by hand, at one-tenth the cost.

## H. R. MARSDEN,

ORIGINAL PATENTEE AND SOLE MAKER OF BLAKE'S

# Improved Patent Stone Breakers & Ore Crushers.

New Patent Reversible Jaws,  
in Sections, with Patent  
Faced Backs.

NEW PATENT ADJUSTABLE  
TOGGLES.

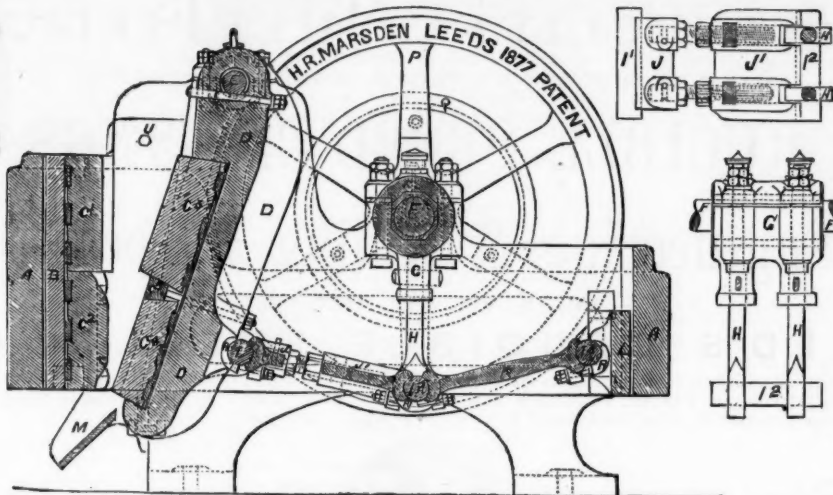
OVER 2500 IN USE.

New Patent Draw-back  
Motion.

NEW PATENT STEEL TOGGLE BEARINGS.

70

PRIZE MEDALS.



READ THIS—

Wharhole Lime Works, Maryport, Whitehaven,

November 7, 1878.

H. E. MARSDEN, Esq., Soho Foundry, Meadow-lane, Leeds.  
DEAR SIR,—The machine I have in use is one of the large size, 24 in. by 12 in. The quantity we are breaking daily with this one machine is 250 tons, the jaw being set to break to a size of 2½ in. We have, however, frequently broken over 300 tons per day of ten hours, and on several occasions over 350 tons during the same period. The stone we break is the blue mountain limestone, and is used as a flux in the various ironworks in this district. We have now had this machine in daily use for over two years without repairs of any kind, and have never had occasion to complain of any inconvenience in using the machine. I hope the one you are now making for me may do its work equally well. The cost—INCLUDING ENGINE-POWER, COALS, ENGINEMAN, FEEDING, and all EXPENSES OF EVERY KIND—is just 3d. per ton. Should any of your friends feel desirous of seeing one of your machines at work, I shall have much pleasure in showing the one alluded to.

I am, dear Sir, yours very truly,

WILLIAM MILLER.

AND THIS—

Wharhole Lime Works, Aspatria, Cumberland,

July 11th, 1878.

H. R. MARSDEN, Esq., Soho Foundry, Leeds.  
DEAR SIR,—We are in receipt of your letter of 4th inst. I may just state that the stone breaker above named has been under my personal superintendence since its erection, and I have no hesitation in saying that it is as good now as it was five years ago.

I am, dear Sir, yours faithfully,

FRANCIS GOULD.

GREATLY REDUCED PRICES ON APPLICATION.

ALL BEARINGS are renewable, and made of H.R.M.'s Patent Compound ANTIFRICTION METAL.

CATALOGUES, TESTIMONIALS, &c.

H. R. MARSDEN, SOHO FOUNDRY, LEEDS, ENGLAND.

## The Barrow Rock Drill COMPANY

Are NOW PREPARED to SUPPLY their DRILLS, the ONLY ONES that have been SUCCESSFULLY WORKED in the MINES of CORNWALL. At DOLCOATH MINE, in the HARDEST known ROCK, a SINGLE MACHINE has, since its introduction in July, 1876, driven MORE THAN THREE TIMES the SPEED of HAND LABOUR, and at TWENTY PER CENT. LESS COST PER FATHOM.

In ordinary ends two machines may be worked together, and at a proportionately increased speed. They are strong, light, and simple, easily worked, and adapted for ends and stopes, and the sinking of winzes and shafts.

The company are also prepared to SUPPLY COMPRESSORS, and all necessary appliances for working the said Drills.

Apply to—

LOAM AND SON,  
LISKEARD, CORNWALL.

BICKFORD'S PATENT  
FOR CONVEYING  
CHARGE IN



SAFETY FUSE  
FIRE TO THE  
BLASTING ROCKS &c.

Obtained the PRIZE MEDALS at the "ROYAL EXHIBITION" of 1861; at the "INTERNATIONAL EXHIBITION" of 1862 and 1874, in London; at the "IMPERIAL EXPOSITION," held in Paris, in 1865; at the "INTERNATIONAL EXHIBITION," in Dublin, 1865; at the "UNIVERSAL EXPOSITION," in Paris, 1867; at the "GREAT INDUSTRIAL EXHIBITION," at Antwerp, in 1868; TWO MEDALS at the "UNIVERSAL EXHIBITION," Vienna, in 1873; and at the "EXPOSITION NACIONAL ARGENTINA," Cordoba, South America, 1872.



BICKFORD, SMITH AND CO., of TUCKINGMILL, CORNWALL; ADELPHI BANK CHAMBERS, SOUTH JOHN-STREET, LIVERPOOL; and 55, GRACECHURCH-STREET, LONDON E.C., MANUFACTURERS AND ORIGINAL PATENTERS OF SAFETY-FUSE, having been informed that the name of their firm has been attached to fuse not of their manufacture, beg to call the attention of the trade and public to the following announcement:—

EVERY COIL of FUSE MANUFACTURED by them has TWO SEPARATE THREADS PASSING THROUGH THE COLUMN OF GUNPOWDER, and BICKFORD, SMITH, AND CO. CLAIM SUCH TWO SEPARATE THREADS as THEIR TRADE MARK.

Second Edition. Just published, price 8s. 6d.

A NEW GUIDE TO THE IRON TRADE; OR, MILL MANAGERS' AND STOCK-TAKERS' ASSISTANT; Comprising a Series of New and Comprehensive Tables, practically arranged to show at one view the Weight of Iron required to produce Boiler-plates, Sheet-Iron, and Flat, Square, and Round Bars, as well as Hoop or Strip Iron of any dimensions. To which is added a variety of Tables for the convenience of Merchants, including a Russian Table. By JAMES ROSE. Bateman's Hill Ironworks, Bradley, near Bilston.

OPINIONS OF THE PRESS.

"The Tables are plainly laid down, and the information desired can be instantly and accurately obtained."—*Mining Journal*.  
"900 copies have been ordered in Wigan alone, and this is but a tithe of those to whom the book should commend itself."—*Wigan Examiner*.  
"The work is replete on the subject of underground management."—*M. BANK Colliery Proprietor*.  
To be had on application at the MINING JOURNAL Office, 26, Fleet-street, London.

THE GREAT ADVERTISING MEDIUM FOR WALES.

THE SOUTH WALES EVENING TELEGRAM (DAILY), and SOUTH WALES GAZETTE (WEEKLY), established 1857.

The largest and most widely circulated papers in Monmouthshire and South Wales. CHIEF OFFICES—NEWPORT, MON., and at CARDIFF.

The "Evening Telegram" is published daily, the first edition at Three P.M., the second edition at Five P.M. On Friday, the "Telegram" is combined with the "South Wales Weekly Gazette," and advertisements ordered for not less than six consecutive insertions will be inserted at a uniform charge in both papers. P.O.O. and cheques payable to Henry Russell Evans, 14, Commercial-street Newport, Monmouthshire.

THE IRON AND COAL TRADES' REVIEW. The IRON AND COAL TRADES' REVIEW is extensively circulated amongst the Iron Producers, Manufacturers, and Consumers, Coalowners, &c., in all the iron and coal districts. It is, therefore, one of the leading organs for advertising every description of Iron Manufactures, Machinery, New Inventions, and all matters relating to the Iron, Coal, Hardware, Engineering, and Metal Trades in general. Offices of the Review: 7, Westminster Chambers, S.W. Remittances payable to W. T. Fringle.

## THE "CHAMPION" ROCK BORER

MINE AND QUARRY STANDS, STEEL DRILLS, SPECIALLY PREPARED INDIARUBBER HOSE, TESTED IRON PIPES, &c.



## Air-Compressing Machinery,

Simple, strong, and giving most excellent results, and  
ELECTRIC BLASTING APPARATUS.

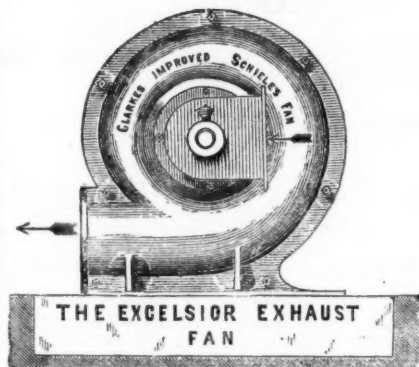
Full particulars of rapid and economical work effected by this machinery, on application.

CONTRACTS TAKEN, OR SPECIAL TERMS FOR HIRE.

ULLATHORNE AND CO., Mechanical and Consulting Engineers, 63, QUEEN VICTORIA STREET, LONDON, E.C.

## CLARKE AND SUTCLIFFE.

CLARKE'S SILENT FANS,  
BLAST AND EXHAUST.  
MINE VENTILATORS.  
HAND-POWER FANS FOR SINKING  
AND DRIFTING.  
PORTABLE FORGES.  
SHIP VENTILATORS.  
SLATE MACHINERY.  
SMITHS' HEARTHS.  
TURBINE WATER-WHEELS.  
DOUBLE-ACTING STEAM PUMP.



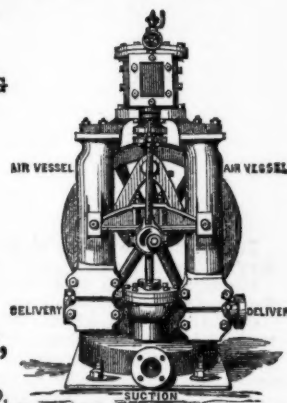
THE EXCELSIOR EXHAUST FAN

UNION IRONWORKS,

Rochdale Road, Manchester,

LATE

THE UNION ENGINEERING COMPANY, LIMITED.



GOLD MEDAL AWARDED, PARIS EXHIBITION, 1878.

## THOMAS TURTON AND SONS,

MANUFACTURERS OF

MINING STEEL of every description.

CAST STEEL FOR TOOLS. CHISEL, SHEAR, BLISTER, & SPRING STEEL  
MINING TOOLS & FILES of superior quality.

EDGE TOOLS, HAMMERS, PICKS, and all kinds of TOOLS for RAILWAYS, ENGINEERS, CONTRACTORS, and PLATELAYERS.

LOCOMOTIVE ENGINE, RAILWAY CARRIAGE and WAGON SPRINGS and BUFFERS.

SHEAF WORKS & SPRING WORKS, SHEFFIELD.

LONDON OFFICES.—90 CANNON STREET, E.C. PARIS DEPOT.—12, RUE DES ARCHIVES.  
NEW YORK STORE.—102, JOHN STREET.

## J. WOOD ASTON AND CO., STOURBRIDGE

(WORKS AND OFFICES ADJOINING CRADLEY STATION),

Manufacturers of

CRANE, INCLINE, AND PIT CHAINS,

Also CHAIN CABLES, ANCHORS, and RIGGING CHAINS, IRON and STEEL SHOVELS, SPADES, FORKS, ANVILS, VICES, SCYTHES, HAY and CHAFF KNIVES, PICKS, HAMMERS, NAILS, RAILWAY and MINING TOOLS, FRYING PANS, BOWLS, LADLES, &c., &c.

Crab Winches, Pulley and Snatch Blocks, Screw and Lifting Jacks, Ship Knees, Forgings, and Use Iron of all descriptions.

STOURBRIDGE FIRE BRICKS AND CLAY.